

**DRAINAGE REPORT**  
**5 SABRINA FARM ROAD**  
**WELLESLEY, MASSACHUSETTS**

**June 29, 2020**



**Cheney Engineering Co., Inc.**  
**53 Mellen Street**  
**Needham, Massachusetts 02030**

 **ORIGINAL**

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Narrative

Pre-Development Summary

The 3.4 -acre site is located at 5 Sabrina Farm Road in Wellesley, Massachusetts and is shown on Wellesley assessor's map 116 as parcel 9. The site is currently developed with a single-family dwelling, garage, sheds, tennis court and swimming pool. Approximately 70% of the site consists of building and landscaped areas. The landscaped areas include opens space combination of trees and lawn, shrub areas and lawn areas. Another 15%+/- of the property lies below the water level of Sabrina Pond. The remaining 15% of the site is currently either underdeveloped or has returned to a non-maintained natural vegetated conditions. Planning board considered and approved the waiver request on 3/4/20 limiting the area to be analyzed to 23,000+/- square feet. Attached you will find copy of the waiver request and limit of work plan that was provided to planning board. On-site soil testing indicate Woodbridge sandy loam soils. For all intents and purposes area being analyzed consists of 3-catchment areas. See "Pre-Development Watershed Delineation Plan" attached to this report.

**TABLE 1 - EXISTING CONDITIONS**

<b>Pre Analysis</b>	<b>2 Yr Rate (cfs)</b>	<b>2 Yr Vol. (af)</b>	<b>10 Yr Rate (cfs)</b>	<b>10 Yr Vol. (af)</b>	<b>50 Yr Rate (cfs)</b>	<b>50 Yr Vol. (af)</b>	<b>100 Yr Rate (cfs)</b>	<b>100 Yr Vol. (af)</b>
6S	0.06	0.008	0.24	0.024	0.51	0.047	0.63	0.058
9S	0.08	0.010	0.30	0.030	0.62	0.059	0.77	0.072
10S	0.09	0.007	0.23	0.017	0.42	0.031	0.51	0.037
6S+9S+10S	0.23	0.025	0.77	0.071	1.55	0.137	1.91	0.167

Post-Development Summary

Upon construction of the addition as a result of drainage mitigation measures it is expected a decrease on the 2, 10, 50 and 100 year storm water run-off rates and volumes. The owner is proposing infiltration stormwater controls from roof runoff to collect and mitigate the storm events. See "Post-Development Watershed Delineation Plan" attached to this report.

**TABLE 2 - PROPOSED CONDITIONS**

<b>Post Analysis</b>	<b>2 Yr Rate (cfs)</b>	<b>2 Yr Vol. (af)</b>	<b>10 Yr Rate (cfs)</b>	<b>10 Yr Vol. (af)</b>	<b>50 Yr Rate (cfs)</b>	<b>50 Yr Vol. (af)</b>	<b>100 Yr Rate (cfs)</b>	<b>100 Yr Vol. (af)</b>
10S	0.06	0.008	0.23	0.024	0.48	0.047	0.60	0.058
11S	0.08	0.009	0.28	0.025	0.54	0.047	0.67	0.057
12S	0.09	0.007	0.23	0.017	0.42	0.031	0.51	0.037
10S+11S+12S	0.23	0.024	0.74	0.066	1.44	0.125	1.78	0.152

## Calculation methods

The proposed storm water control system has been designed to manage the 2-year, 10-year, 50-year and 100-year Type III storm events. Run-off rates and run-off volumes were determined using a hydrology software program developed by HydroCad. This program analyzes site hydrology by the graphic peak discharge method documented in Technical Release No. 55 published by the USDA Soil Conservation Service.

The following variables were developed for the contributing watersheds (drainage areas) in order to complete the analysis:

- Rainfall Depth - A hydrologic analysis was performed for the 24-hour 2-year, 10-year, 50-year, and 100-year Type III storm event (3.31, 5.19, 7.26, 8.17 inches respectively) for each drainage area. The rainfall depths for the study area were obtained from available charts published in Technical Release No. 55 and Wellesley Bylaw Regulations.
- Run-off Curve Number (RCN) - The RCN is the hydrologic characteristic that determines the depth of rainfall run-off from a given storm event. It is dependent upon soil conditions and land use. Generally, higher curve numbers are associated with less pervious soils and, hence, greater amounts of run-off. The RCN for this project was determined from the Soils Conservation Soils maps and Soil testing data for the site.

Time of Concentration - The time of concentration is defined as the time it takes run-off to travel from the hydrologically most distant point of the watershed to the design point of interest. This parameter is dependent on the characteristics of the ground surface and condition of the travel path.

Results of Analysis

A storm water analysis was performed for the 2-year, 10-year, 50-year, 100-year storm events in order to determine that there will be no increase in storm water run-off post construction.

<b>Post Analysis</b>	<b>2 Yr Rate (cfs)</b>	<b>2 Yr Vol. (af)</b>	<b>10 Yr Rate (cfs)</b>	<b>10 Yr Vol. (af)</b>	<b>50 Yr Rate (cfs)</b>	<b>50 Yr Vol. (af)</b>	<b>100 Yr Rate (cfs)</b>	<b>100 Yr Vol. (af)</b>
10S+11S+12S	0.23	0.024	0.74	0.066	1.44	0.125	1.78	0.152
<b>Pre Analysis</b>	<b>2 Yr Rate (cfs)</b>	<b>2 Yr Vol. (af)</b>	<b>10 Yr Rate (cfs)</b>	<b>10 Yr Vol. (af)</b>	<b>50 Yr Rate (cfs)</b>	<b>50 Yr Vol. (af)</b>	<b>100 Yr Rate (cfs)</b>	<b>100 Yr Vol. (af)</b>
6S+9S+10S	0.23	0.025	0.77	0.071	1.55	0.137	1.91	0.167

<b>NET % Change</b>	<b>2 Yr Rate</b>	<b>2 Yr Vol.</b>	<b>10 Yr Rate</b>	<b>10 Yr Vol.</b>	<b>50 Yr Rate</b>	<b>50 Yr Vol.</b>	<b>100 Yr Rate</b>	<b>100 Yr Vol.</b>
Post - Exist.	0%	-4%	-4%	-7%	-7%	-9%	-7%	-9%

## Operation and Maintenance Plan

Items to be inspected and maintained:

- Drainage field
- Drain downspouts

For the on-site stormwater disposal system to operate properly, the various components need periodic inspection and maintenance by the system operator. In addition to the following maintenance requirements and schedule, the approving authority may specify additional requirements.

The Drainage field system incorporates flow from the roof drain gutters. Do not pile snow over the the drainage field. Inspect the connections from time to time to make sure that the roof water is entering the system.

1. Inspect the site on a regular basis, after installation of drainage systems during construction time. After this time period, inspect the site annually, and after there has been heavy rain or storms, for this is the time when the drainage voids can become clogged with organic debris.

2. Inspection report must be sent to the town of Wellesley town Engineer annually.





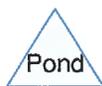
BASIN A



BASIN B



BASIN C



**Routing Diagram for 5 Sabrina Farm Rd, Wellesley\_EXISTING**  
Prepared by Cheney Engineering Co., Inc.  
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## 5 Sabrina Farm Rd, Wellesley\_EXISTING

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.210	61	>75% Grass cover, Good, HSG B (6S, 9S, 10S)
0.069	98	Roofs, HSG B (6S, 9S, 10S)
0.249	55	Woods, Good, HSG B (6S, 9S)
<b>0.528</b>	<b>63</b>	<b>TOTAL AREA</b>

## 5 Sabrina Farm Rd, Wellesley\_EXISTING

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### Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.528	HSG B	6S, 9S, 10S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>0.528</b>		<b>TOTAL AREA</b>

**5 Sabrina Farm Rd, Wellesley\_EXISTING**

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.210	0.000	0.000	0.000	0.210	>75% Grass cover, Good	6S, 9S, 10S
0.000	0.069	0.000	0.000	0.000	0.069	Roofs	6S, 9S, 10S
0.000	0.249	0.000	0.000	0.000	0.249	Woods, Good	6S, 9S
<b>0.000</b>	<b>0.528</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.528</b>	<b>TOTAL AREA</b>	

**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 2-Year Rainfall=3.31"

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**Summary for Subcatchment 6S: BASIN A**

Runoff = 0.06 cfs @ 12.25 hrs, Volume= 0.008 af, Depth= 0.49"

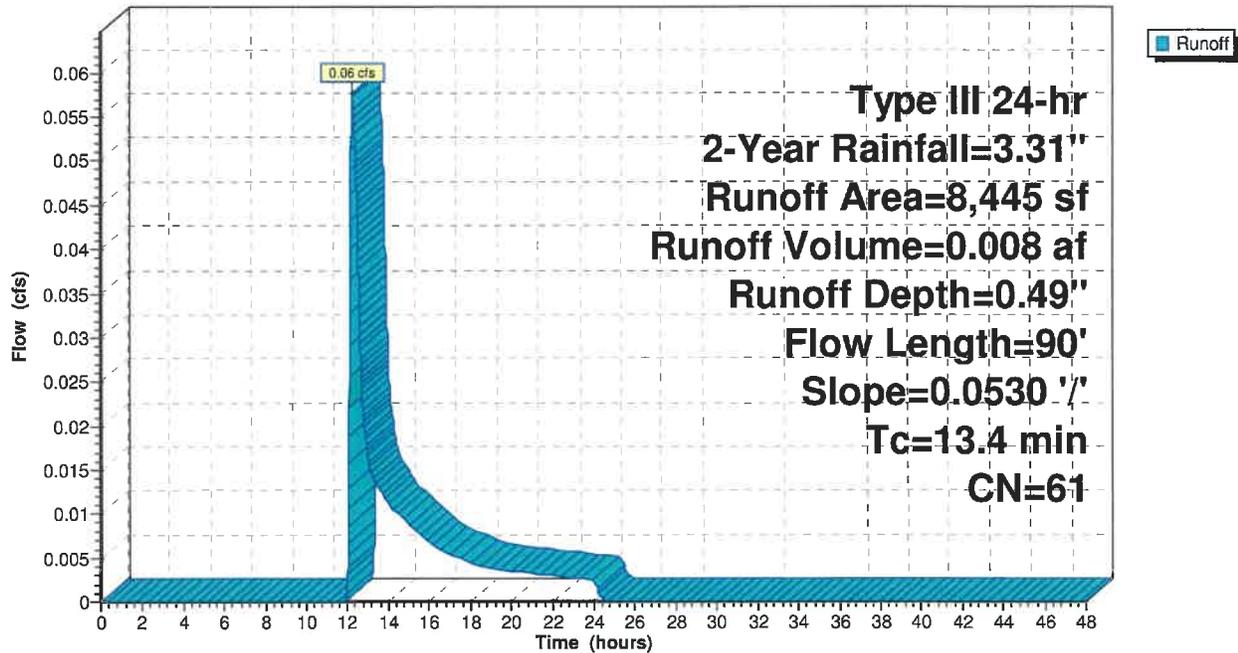
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
793	98	Roofs, HSG B
2,427	61	>75% Grass cover, Good, HSG B
5,225	55	Woods, Good, HSG B
8,445	61	Weighted Average
7,652		90.61% Pervious Area
793		9.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	90	0.0530	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 6S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 2-Year Rainfall=3.31"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Subcatchment 9S: BASIN B**

Runoff = 0.08 cfs @ 12.25 hrs, Volume= 0.010 af, Depth= 0.53"

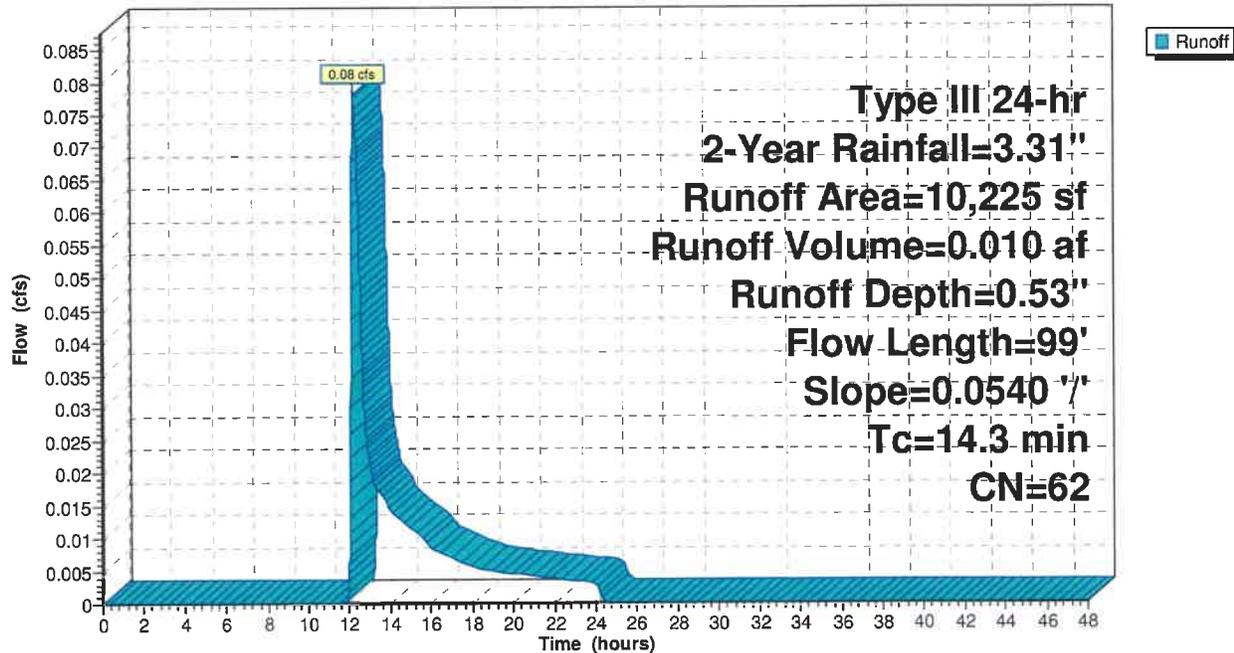
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,353	61	>75% Grass cover, Good, HSG B
5,625	55	Woods, Good, HSG B
10,225	62	Weighted Average
8,978		87.80% Pervious Area
1,247		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	99	0.0540	0.12		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 9S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 2-Year Rainfall=3.31"

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**Summary for Subcatchment 10S: BASIN C**

Runoff = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af, Depth= 0.84"

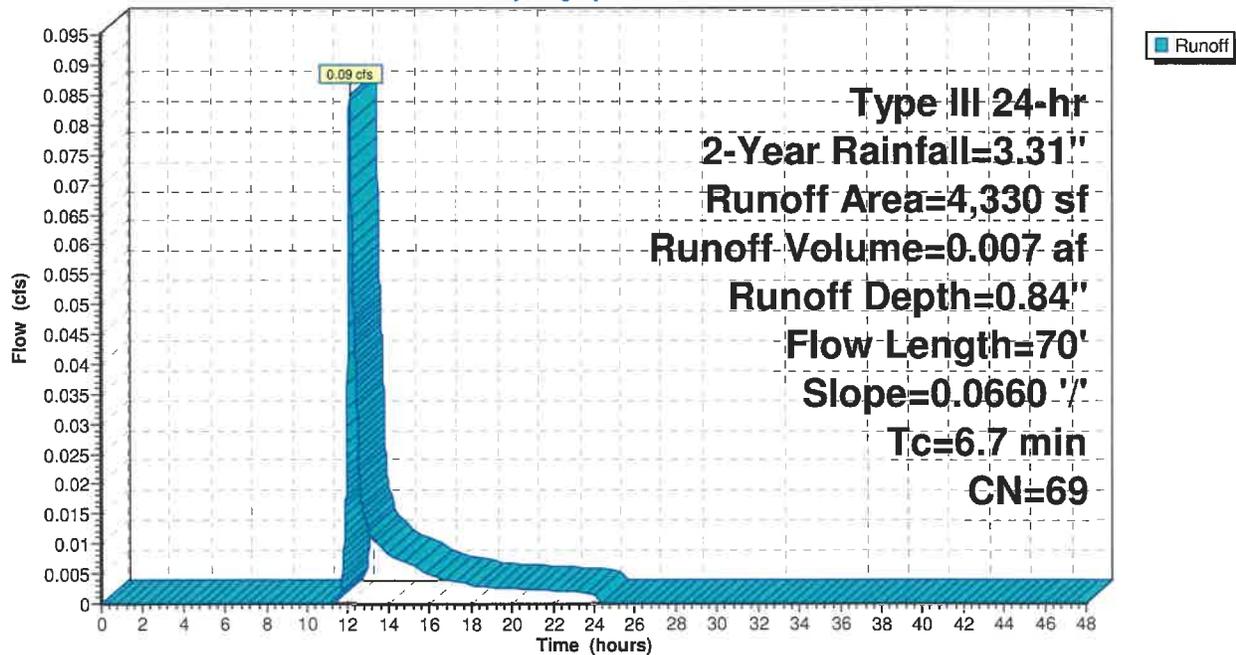
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 10S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 6S: BASIN A**

Runoff = 0.24 cfs @ 12.20 hrs, Volume= 0.024 af, Depth= 1.48"

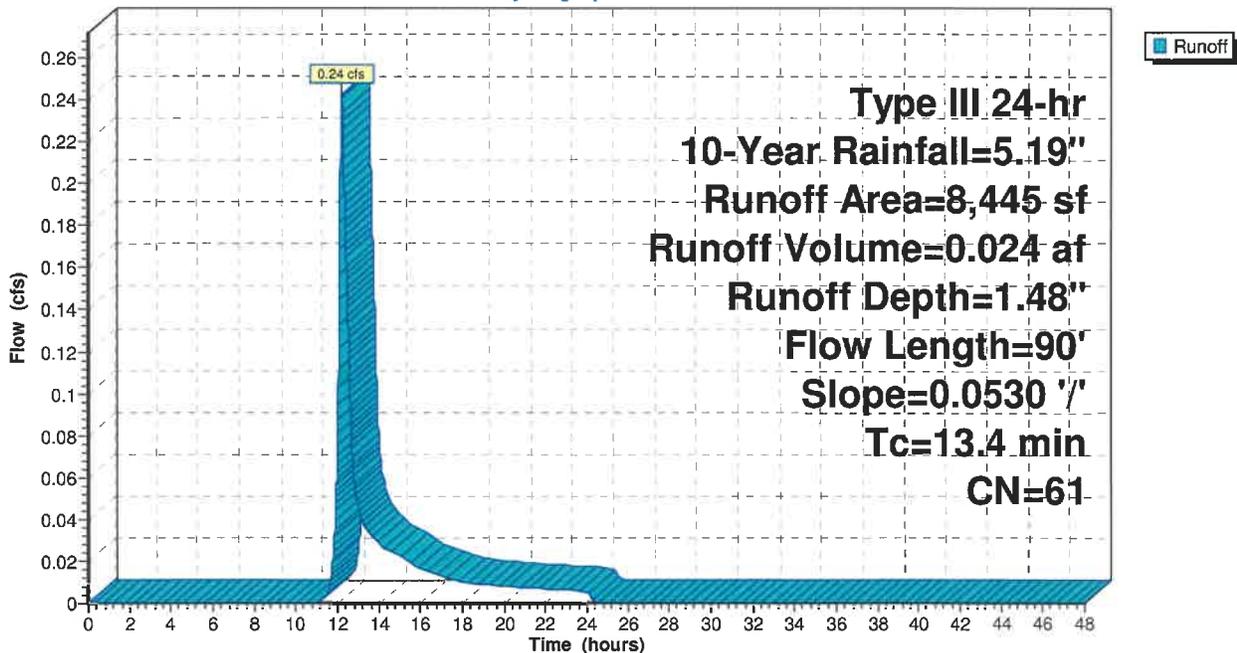
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
793	98	Roofs, HSG B
2,427	61	>75% Grass cover, Good, HSG B
5,225	55	Woods, Good, HSG B
8,445	61	Weighted Average
7,652		90.61% Pervious Area
793		9.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	90	0.0530	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 6S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 9S: BASIN B**

Runoff = 0.30 cfs @ 12.22 hrs, Volume= 0.030 af, Depth= 1.56"

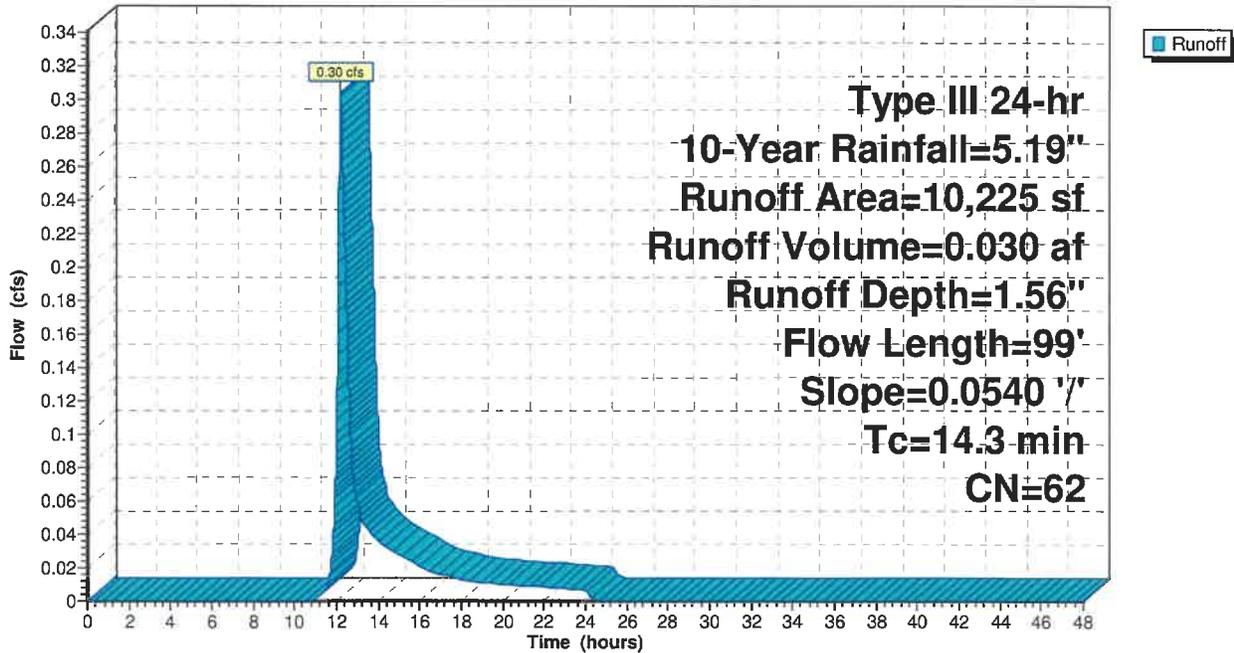
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,353	61	>75% Grass cover, Good, HSG B
5,625	55	Woods, Good, HSG B
10,225	62	Weighted Average
8,978		87.80% Pervious Area
1,247		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	99	0.0540	0.12		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 9S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 10S: BASIN C**

Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 2.10"

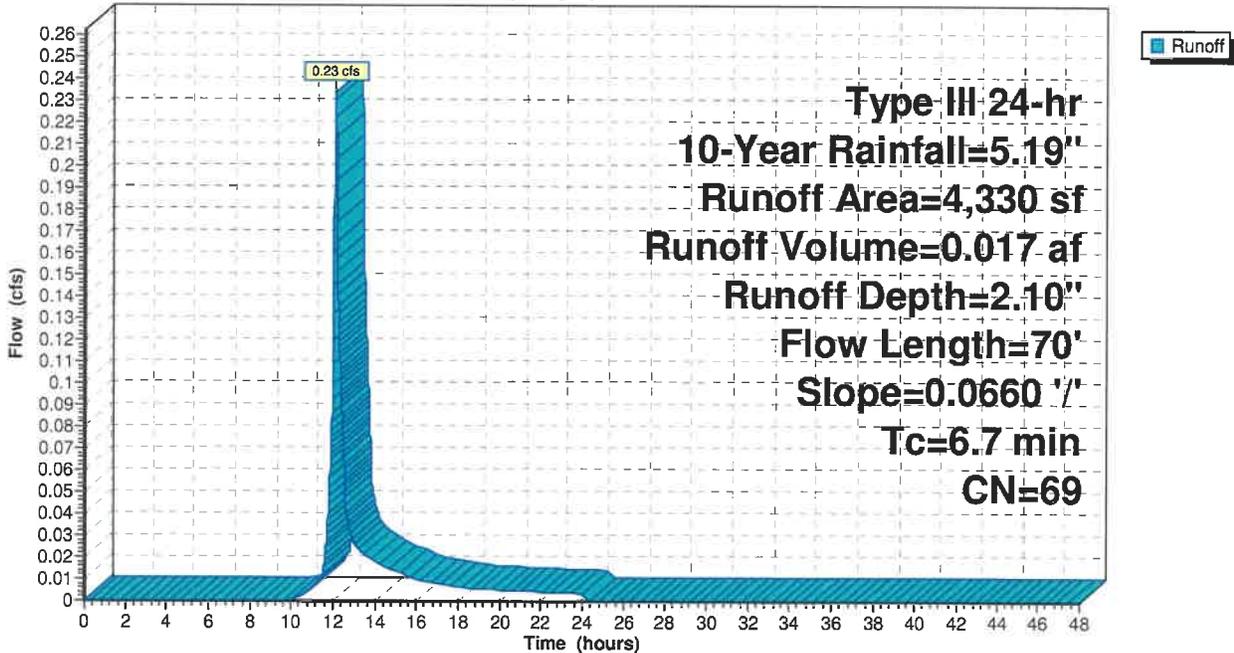
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 10S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 50-Year Rainfall=7.26"

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**Summary for Subcatchment 6S: BASIN A**

Runoff = 0.51 cfs @ 12.19 hrs, Volume= 0.047 af, Depth= 2.89"

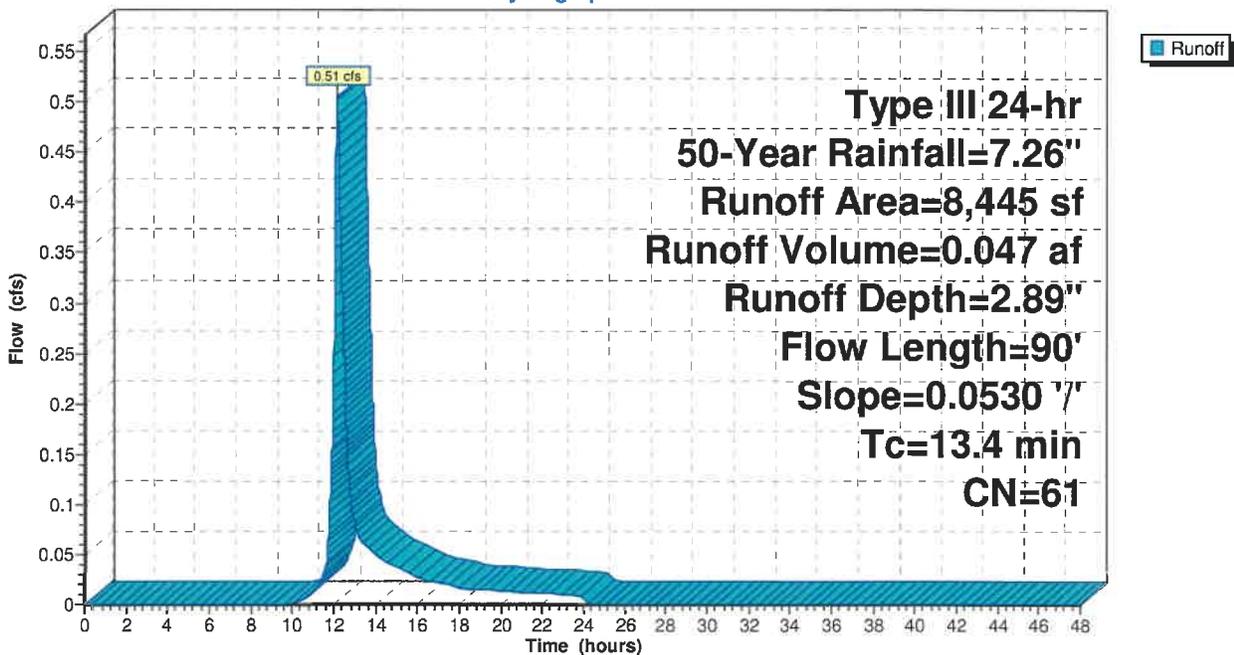
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
793	98	Roofs, HSG B
2,427	61	>75% Grass cover, Good, HSG B
5,225	55	Woods, Good, HSG B
8,445	61	Weighted Average
7,652		90.61% Pervious Area
793		9.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	90	0.0530	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 6S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 50-Year Rainfall=7.26"

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**Summary for Subcatchment 9S: BASIN B**

Runoff = 0.62 cfs @ 12.20 hrs, Volume= 0.059 af, Depth= 2.99"

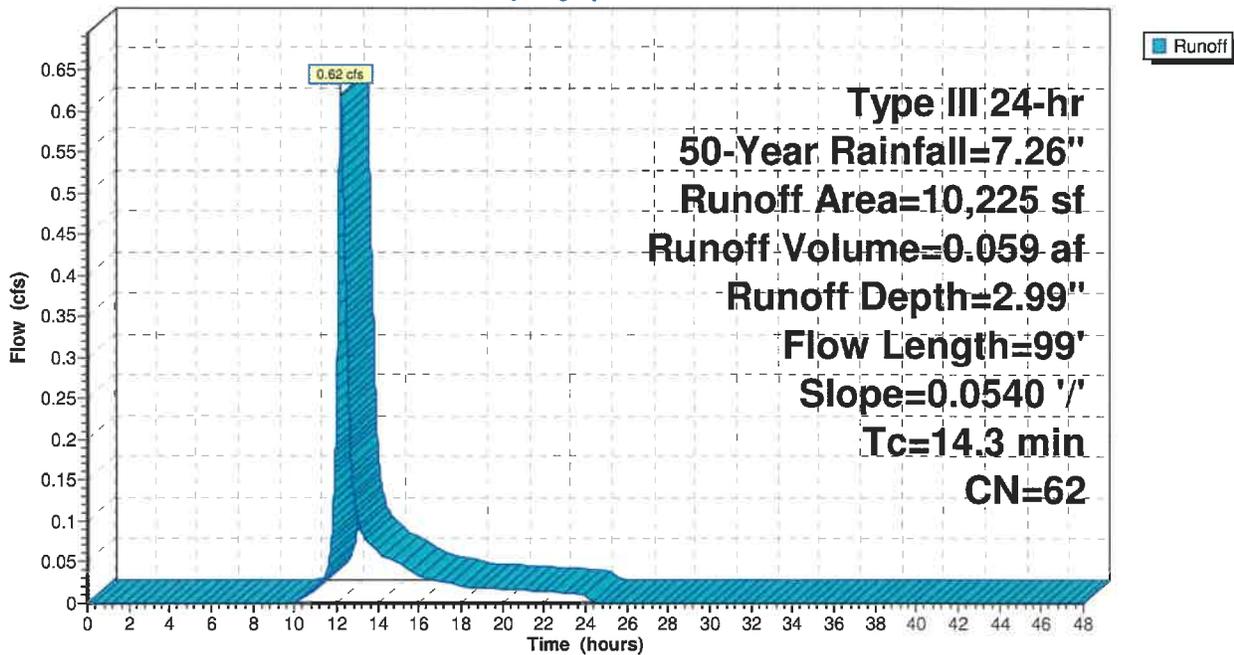
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,353	61	>75% Grass cover, Good, HSG B
5,625	55	Woods, Good, HSG B
10,225	62	Weighted Average
8,978		87.80% Pervious Area
1,247		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	99	0.0540	0.12		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 9S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 50-Year Rainfall=7.26"

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**Summary for Subcatchment 10S: BASIN C**

Runoff = 0.42 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 3.73"

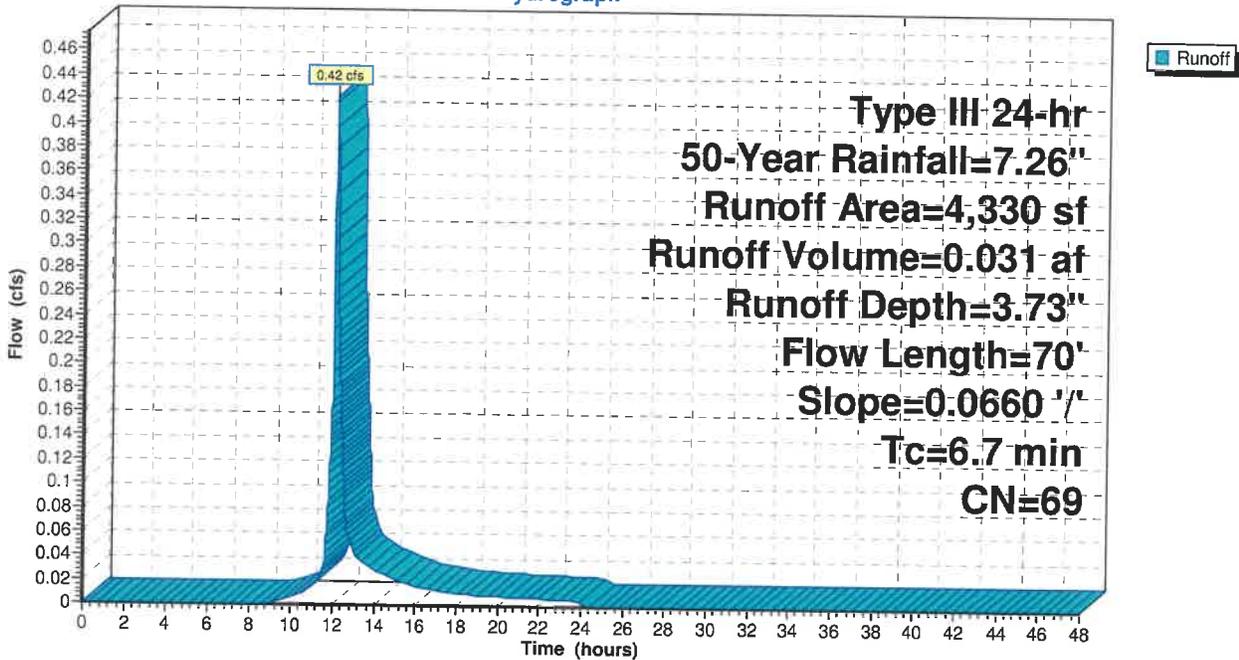
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 10S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 100-Year Rainfall=8.17"

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**Summary for Subcatchment 6S: BASIN A**

Runoff = 0.63 cfs @ 12.19 hrs, Volume= 0.058 af, Depth= 3.57"

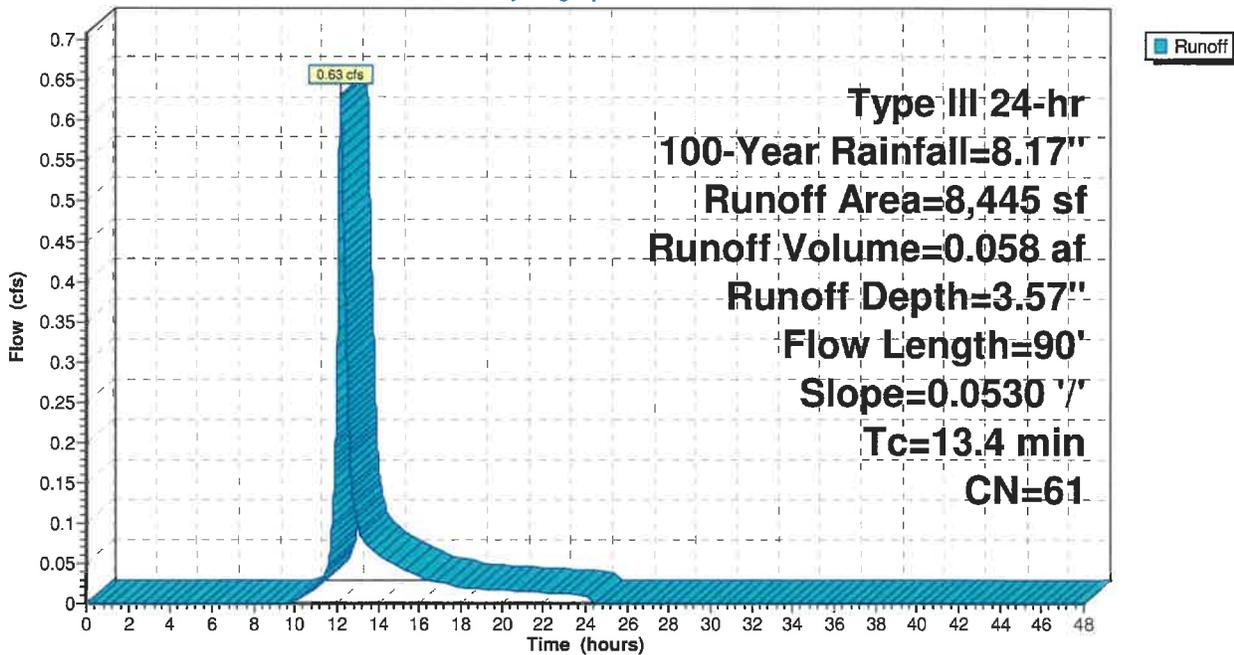
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
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5,225	55	Woods, Good, HSG B
8,445	61	Weighted Average
7,652		90.61% Pervious Area
793		9.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	90	0.0530	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 6S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 100-Year Rainfall=8.17"

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**Summary for Subcatchment 9S: BASIN B**

Runoff = 0.77 cfs @ 12.20 hrs, Volume= 0.072 af, Depth= 3.69"

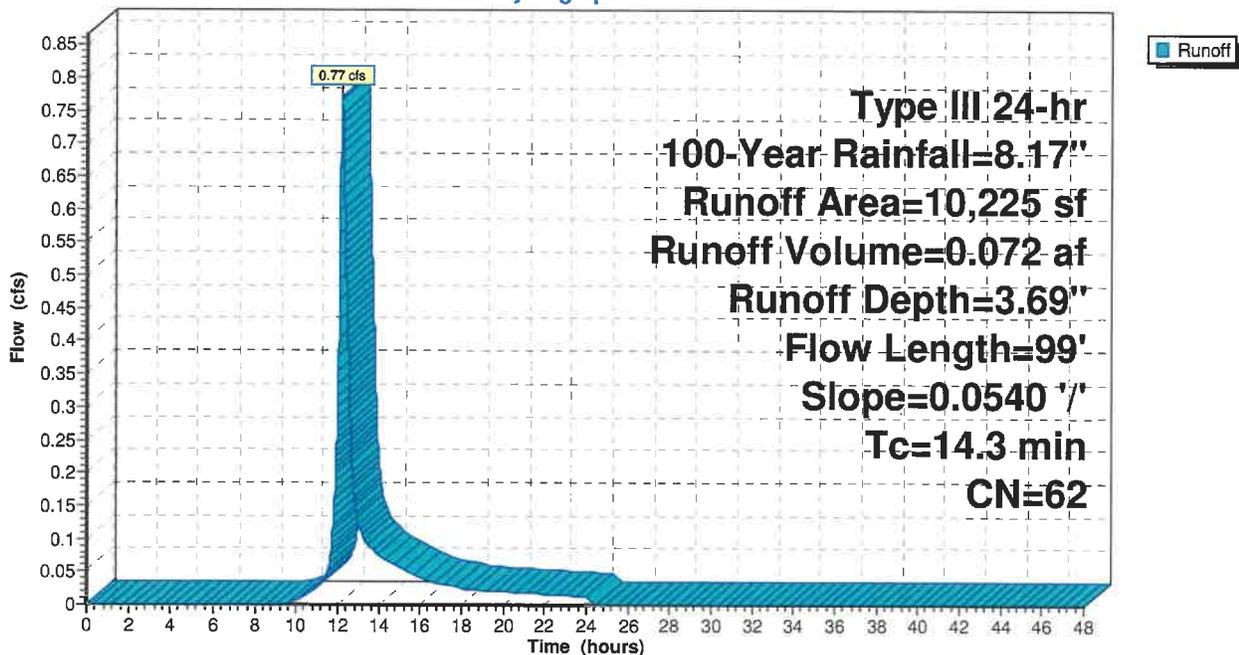
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,353	61	>75% Grass cover, Good, HSG B
5,625	55	Woods, Good, HSG B
10,225	62	Weighted Average
8,978		87.80% Pervious Area
1,247		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	99	0.0540	0.12		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 9S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_EXISTING**

Type III 24-hr 100-Year Rainfall=8.17"

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**Summary for Subcatchment 10S: BASIN C**

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 4.49"

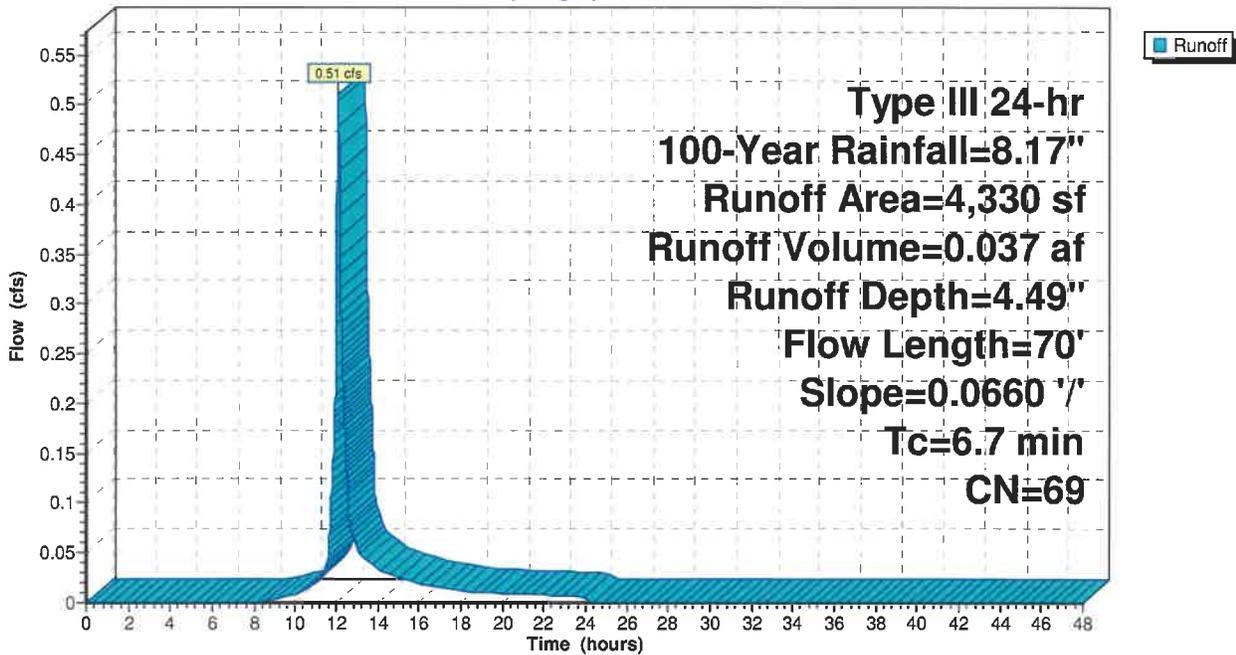
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 10S: BASIN C**

Hydrograph





BASIN A



BASIN B



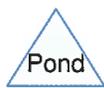
BASIN C



Basin B - ADDITION



ADDITION



Routing Diagram for 5 Sabrina Farm Rd, Wellesley\_PROPOSED  
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## 5 Sabrina Farm Rd, Wellesley\_PROPOSED

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.197	61	>75% Grass cover, Good, HSG B (10S, 11S, 12S)
0.058	98	Roofs, HSG A (9S)
0.071	98	Roofs, HSG B (10S, 11S, 12S)
0.203	55	Woods, Good, HSG B (10S, 11S)
<b>0.528</b>	<b>68</b>	<b>TOTAL AREA</b>

## 5 Sabrina Farm Rd, Wellesley\_PROPOSED

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### Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.058	HSG A	9S
0.470	HSG B	10S, 11S, 12S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>0.528</b>		<b>TOTAL AREA</b>

## 5 Sabrina Farm Rd, Wellesley\_PROPOSED

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### Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.197	0.000	0.000	0.000	0.197	>75% Grass cover, Good	10S, 11S, 12S
0.058	0.071	0.000	0.000	0.000	0.128	Roofs	9S, 10S, 11S, 12S
0.000	0.203	0.000	0.000	0.000	0.203	Woods, Good	10S, 11S
<b>0.058</b>	<b>0.470</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.528</b>	<b>TOTAL AREA</b>	

**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Subcatchment 9S: Basin B - ADDITION**

Runoff = 0.21 cfs @ 12.03 hrs, Volume= 0.015 af, Depth= 3.08"

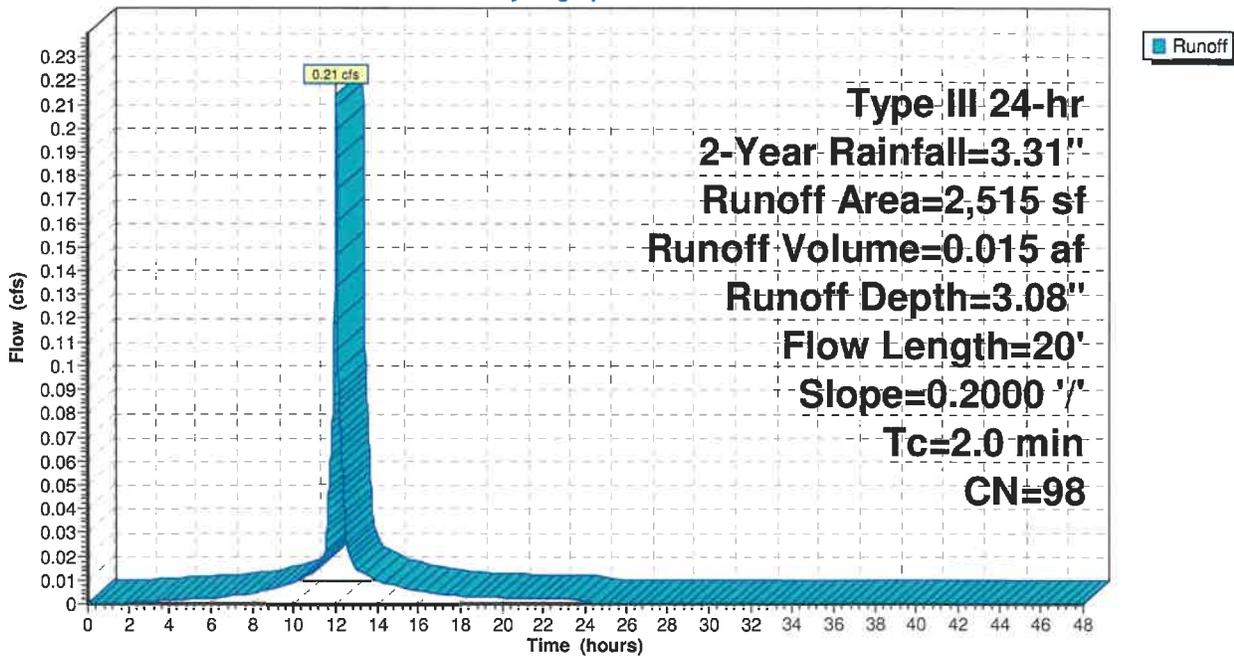
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
2,515	98	Roofs, HSG A
2,515		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.2000	2.50		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.1	20	Total, Increased to minimum Tc = 2.0 min			

**Subcatchment 9S: Basin B - ADDITION**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Subcatchment 10S: BASIN A**

Runoff = 0.06 cfs @ 12.30 hrs, Volume= 0.008 af, Depth= 0.49"

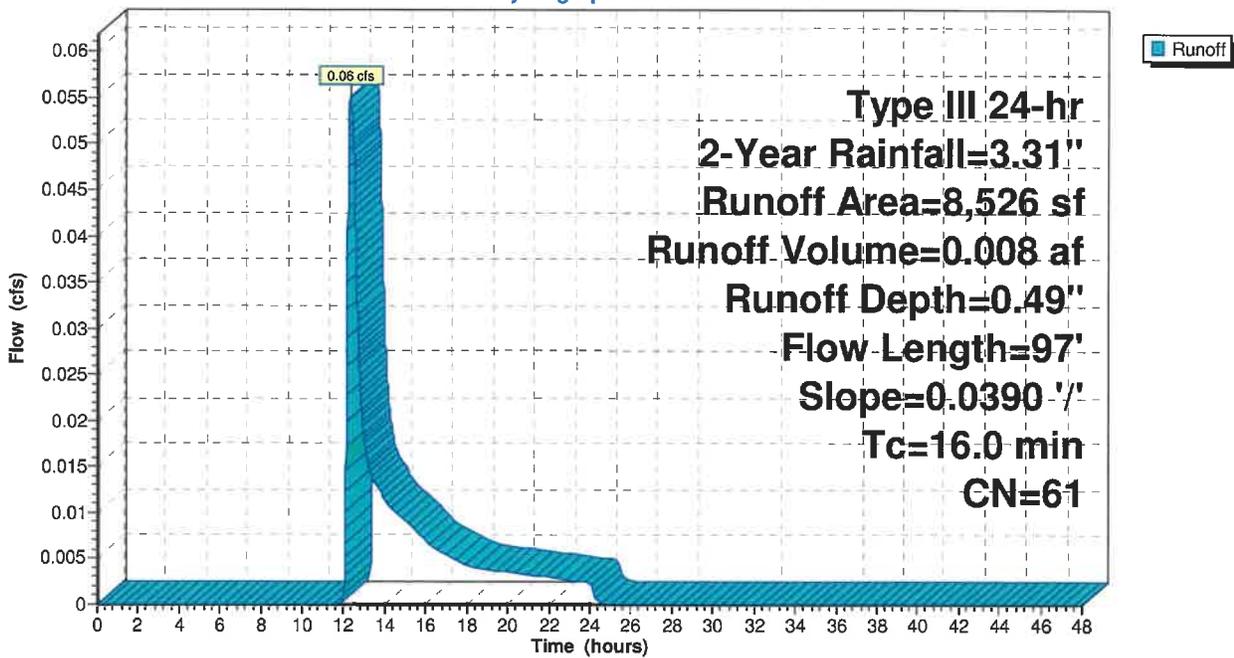
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
889	98	Roofs, HSG B
2,160	61	>75% Grass cover, Good, HSG B
5,477	55	Woods, Good, HSG B
8,526	61	Weighted Average
7,637		89.57% Pervious Area
889		10.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	97	0.0390	0.10		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 10S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

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**Summary for Subcatchment 11S: BASIN B**

Runoff = 0.08 cfs @ 12.19 hrs, Volume= 0.009 af, Depth= 0.61"

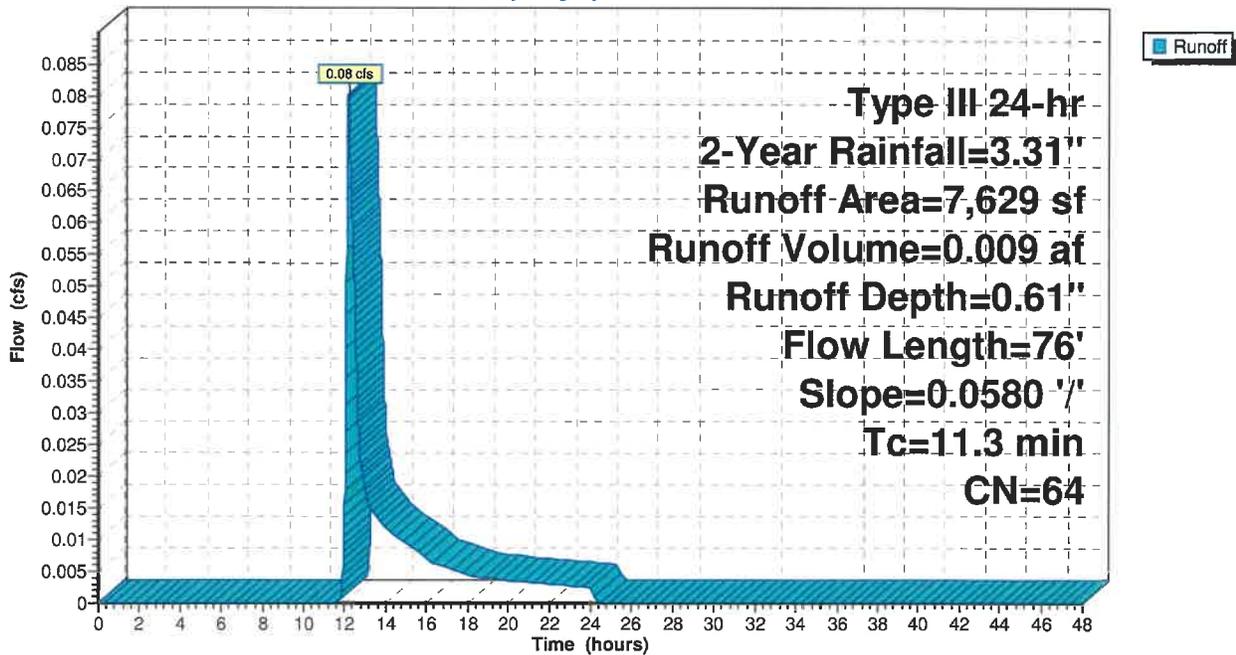
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,028	61	>75% Grass cover, Good, HSG B
3,354	55	Woods, Good, HSG B
7,629	64	Weighted Average
6,382		83.65% Pervious Area
1,247		16.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	76	0.0580	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 11S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

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**Summary for Subcatchment 12S: BASIN C**

Runoff = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af, Depth= 0.84"

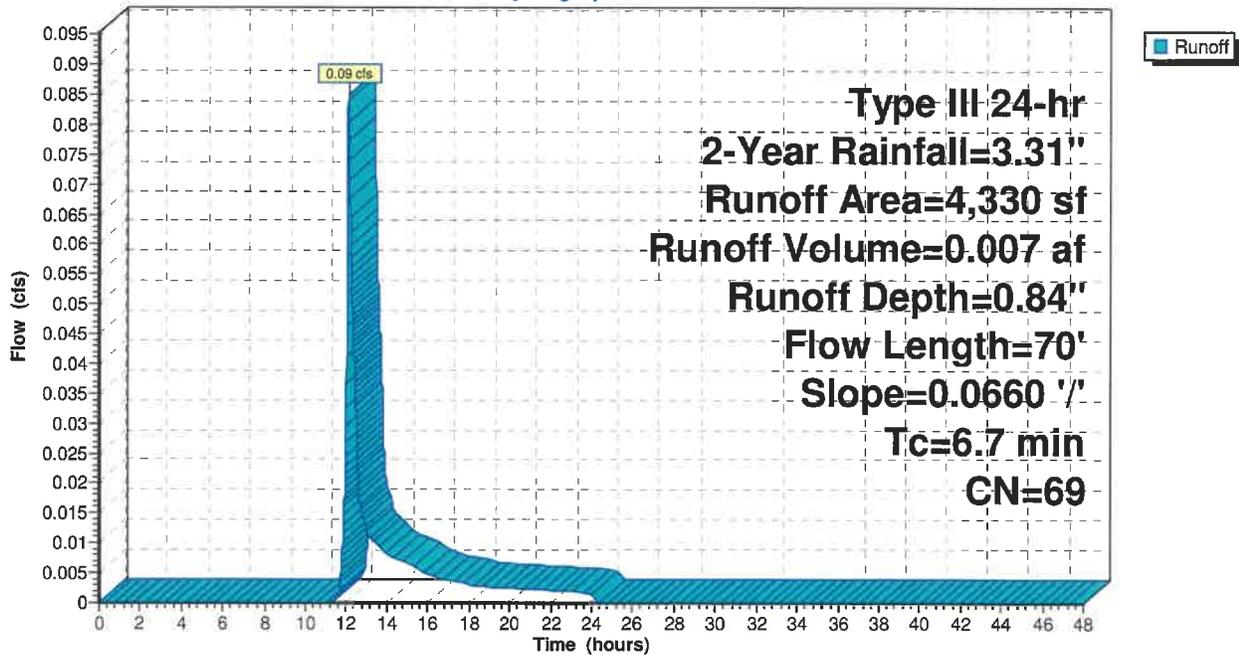
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 12S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

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**Summary for Pond 4P: ADDITION**

Inflow Area = 0.058 ac, 100.00% Impervious, Inflow Depth = 3.08" for 2-Year event  
 Inflow = 0.21 cfs @ 12.03 hrs, Volume= 0.015 af  
 Outflow = 0.02 cfs @ 12.60 hrs, Volume= 0.015 af, Atten= 90%, Lag= 34.1 min  
 Discarded = 0.02 cfs @ 12.60 hrs, Volume= 0.015 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 195.30' @ 12.60 hrs Surf.Area= 0.013 ac Storage= 0.005 af

Plug-Flow detention time= 76.0 min calculated for 0.015 af (100% of inflow)  
 Center-of-Mass det. time= 76.0 min ( 828.0 - 752.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	194.50'	0.009 af	<b>16.50'W x 35.50'L x 2.54'H Field A</b> 0.034 af Overall - 0.008 af Embedded = 0.027 af x 35.0% Voids
#2A	195.00'	0.008 af	<b>Cultec R-150XLHD</b> x 12 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		0.017 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.50'	<b>1.020 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 192.50' Phase-In= 0.02'

**Discarded OutFlow** Max=0.02 cfs @ 12.60 hrs HW=195.30' (Free Discharge)  
 ↑ **1=Exfiltration** ( Controls 0.02 cfs)

**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 2-Year Rainfall=3.31"

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**Pond 4P: ADDITION - Chamber Wizard Field A**

**Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)**

Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf

Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap

Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +24.0" End Stone x 2 = 35.50' Base Length

4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 16.50' Base Width

6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

12 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 333.8 cf Chamber Storage

1,488.8 cf Field - 333.8 cf Chambers = 1,155.0 cf Stone x 35.0% Voids = 404.3 cf Stone Storage

Chamber Storage + Stone Storage = 738.0 cf = 0.017 af

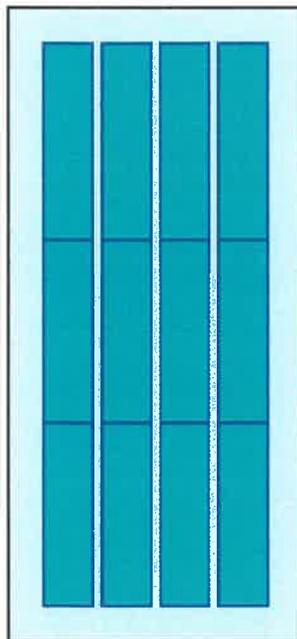
Overall Storage Efficiency = 49.6%

Overall System Size = 35.50' x 16.50' x 2.54'

12 Chambers

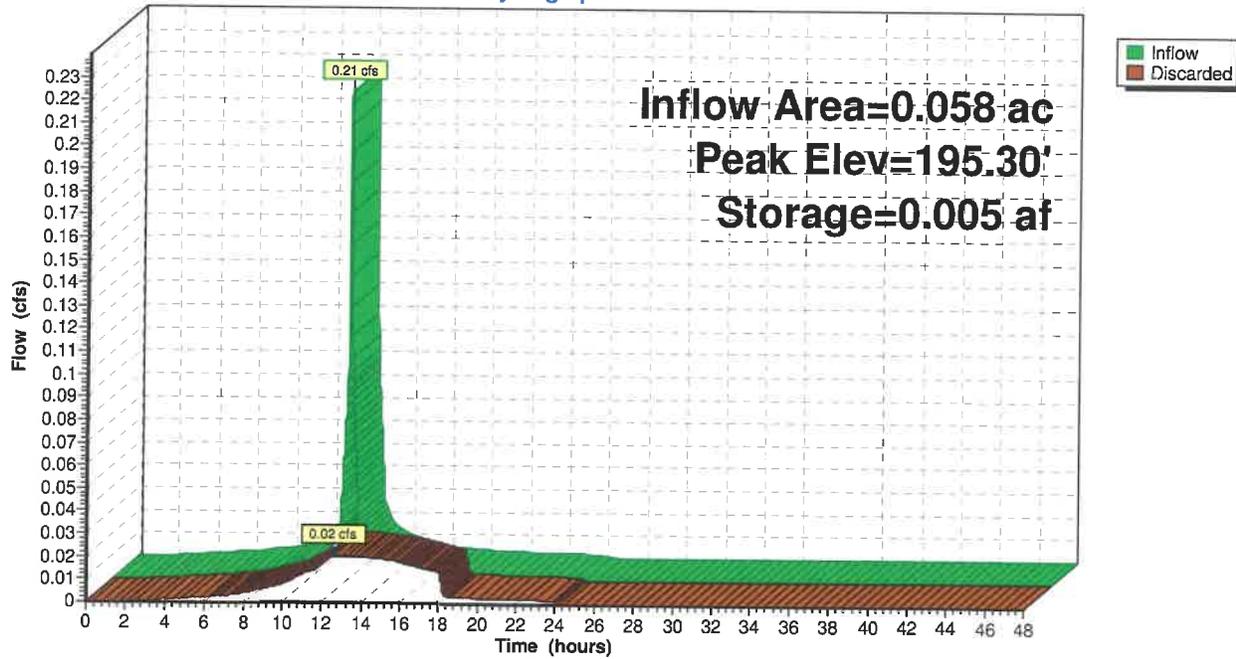
55.1 cy Field

42.8 cy Stone



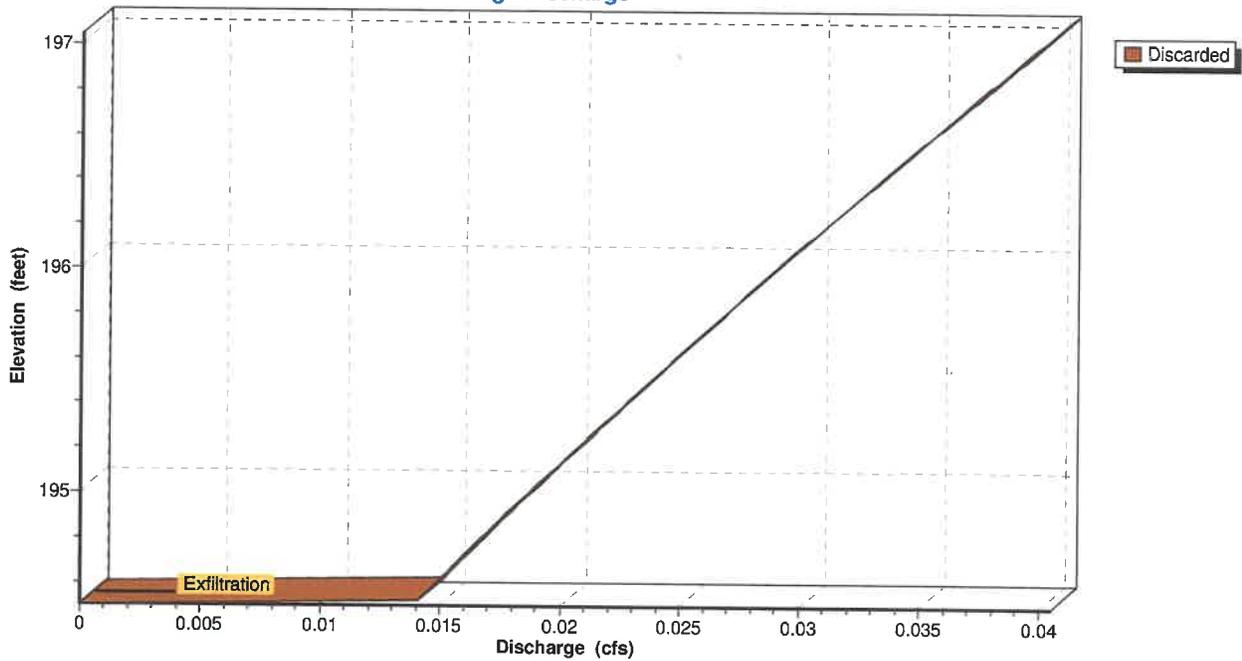
### Pond 4P: ADDITION

Hydrograph

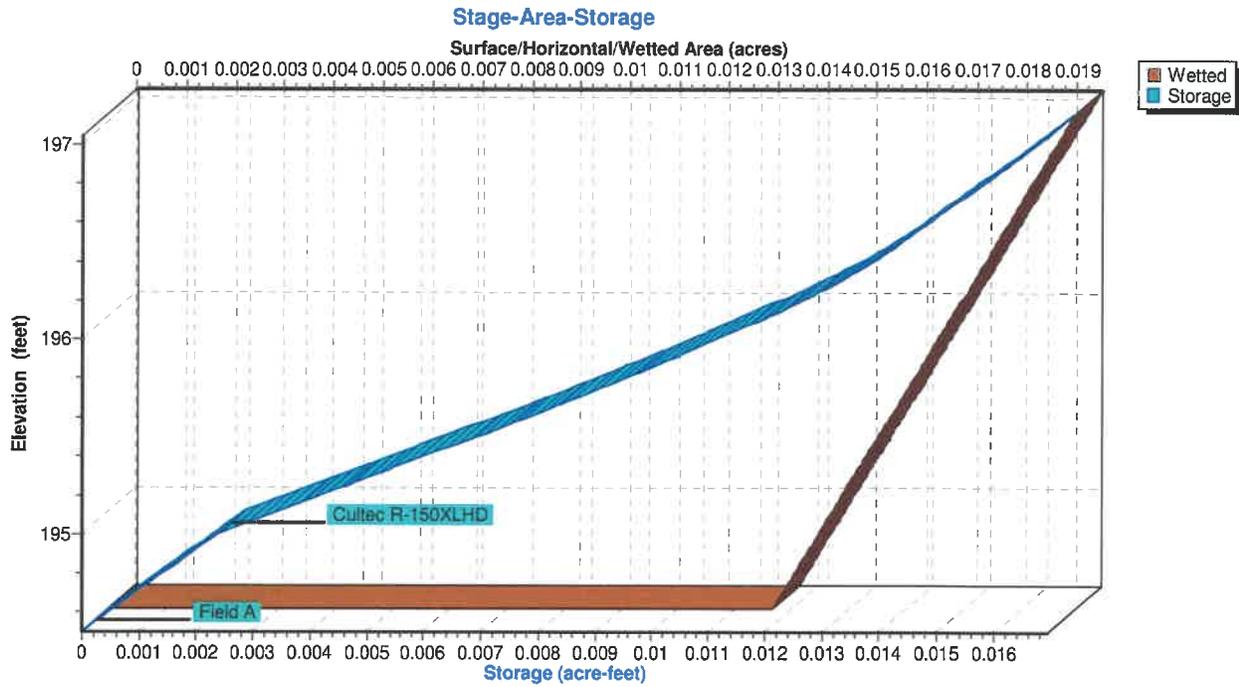


### Pond 4P: ADDITION

Stage-Discharge



### Pond 4P: ADDITION



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 9S: Basin B - ADDITION**

Runoff = 0.34 cfs @ 12.03 hrs, Volume= 0.024 af, Depth= 4.95"

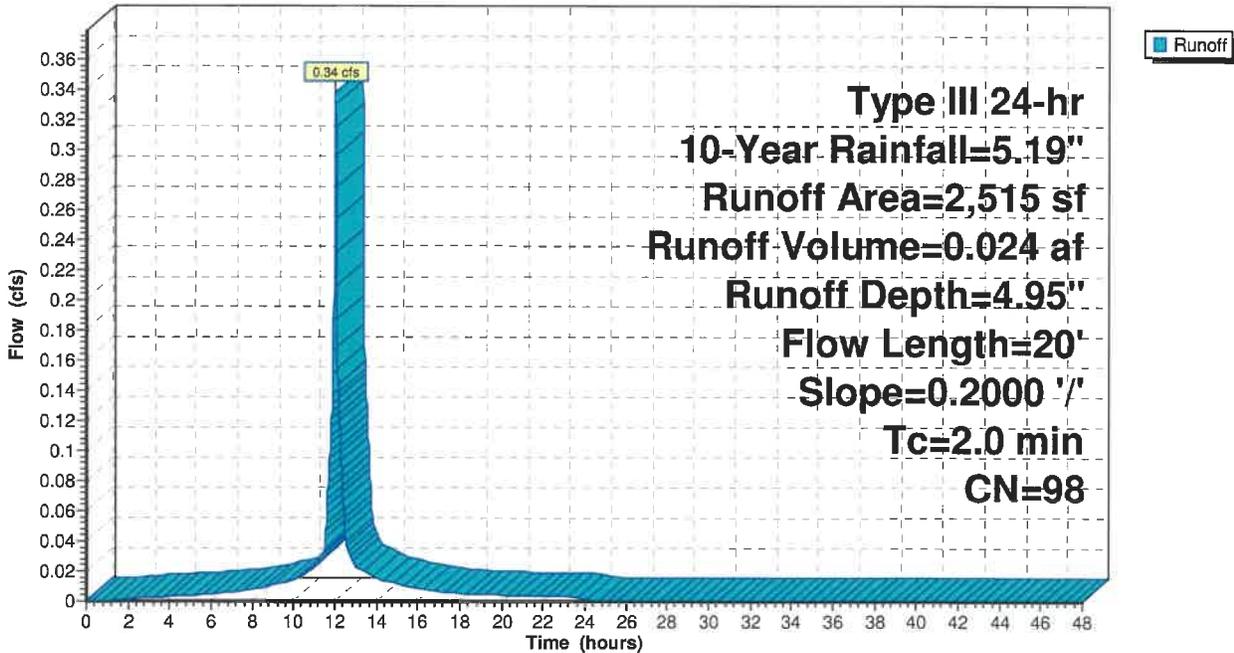
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
2,515	98	Roofs, HSG A
2,515		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.2000	2.50		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.20"
0.1	20	Total, Increased to minimum Tc = 2.0 min			

**Subcatchment 9S: Basin B - ADDITION**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 10S: BASIN A**

Runoff = 0.23 cfs @ 12.25 hrs, Volume= 0.024 af, Depth= 1.48"

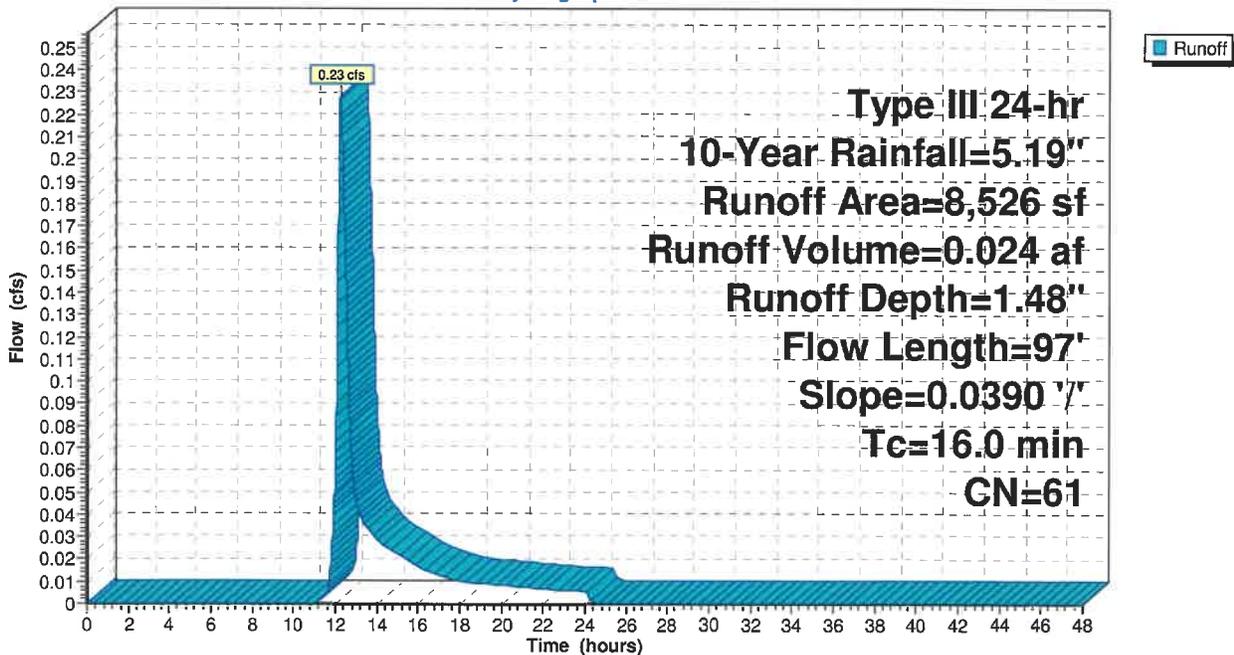
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
889	98	Roofs, HSG B
2,160	61	>75% Grass cover, Good, HSG B
5,477	55	Woods, Good, HSG B
8,526	61	Weighted Average
7,637		89.57% Pervious Area
889		10.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	97	0.0390	0.10		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 10S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 11S: BASIN B**

Runoff = 0.28 cfs @ 12.17 hrs, Volume= 0.025 af, Depth= 1.71"

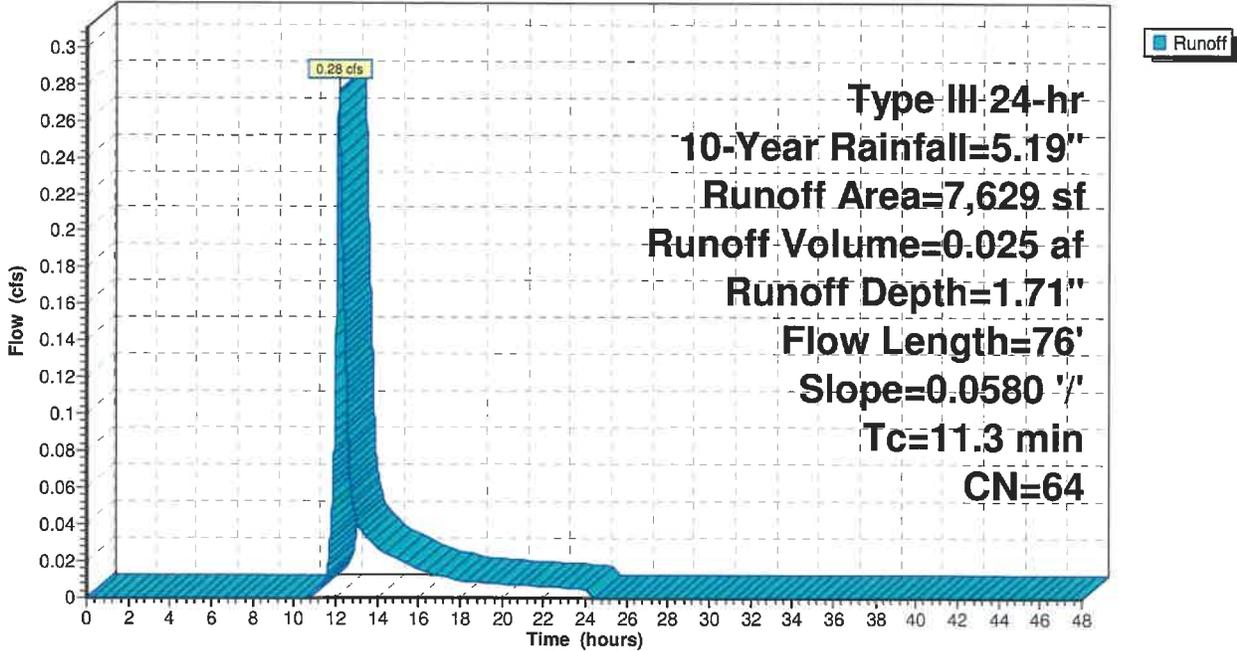
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,028	61	>75% Grass cover, Good, HSG B
3,354	55	Woods, Good, HSG B
7,629	64	Weighted Average
6,382		83.65% Pervious Area
1,247		16.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	76	0.0580	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 11S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Subcatchment 12S: BASIN C**

Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 2.10"

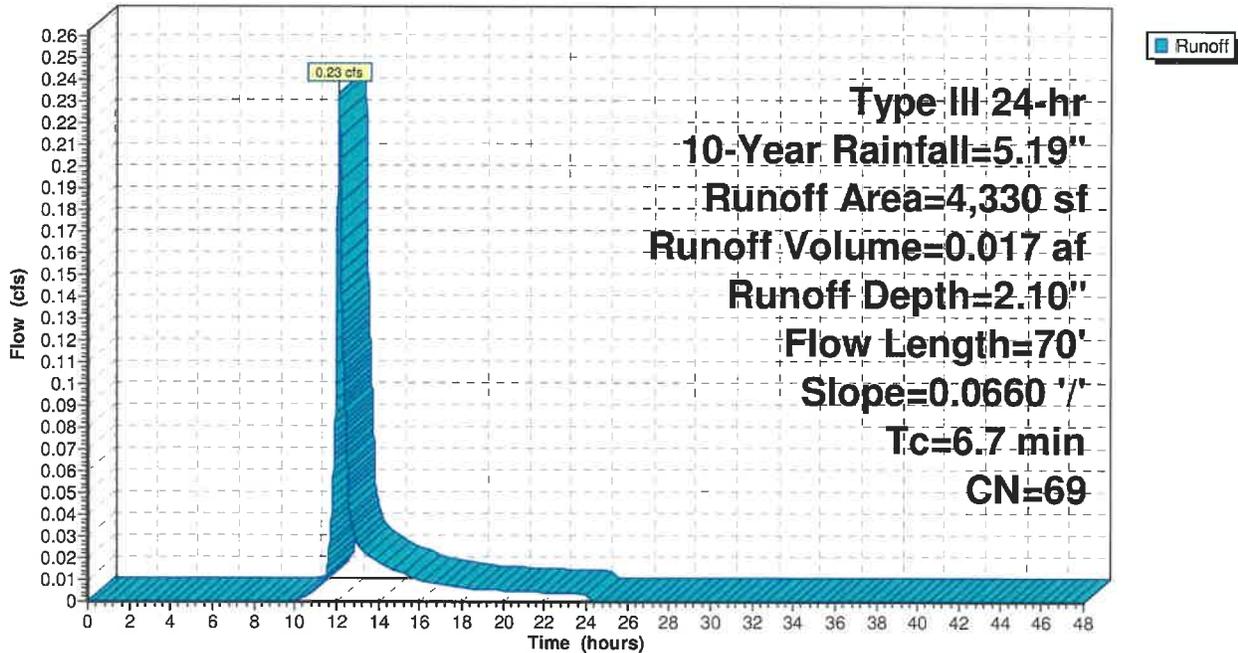
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=5.19"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 12S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 10-Year Rainfall=5.19"

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**Summary for Pond 4P: ADDITION**

Inflow Area = 0.058 ac, 100.00% Impervious, Inflow Depth = 4.95" for 10-Year event  
 Inflow = 0.34 cfs @ 12.03 hrs, Volume= 0.024 af  
 Outflow = 0.03 cfs @ 12.86 hrs, Volume= 0.024 af, Atten= 92%, Lag= 50.1 min  
 Discarded = 0.03 cfs @ 12.86 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 195.78' @ 12.86 hrs Surf.Area= 0.013 ac Storage= 0.009 af

Plug-Flow detention time= 130.4 min calculated for 0.024 af (100% of inflow)  
 Center-of-Mass det. time= 130.4 min ( 874.1 - 743.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	194.50'	0.009 af	<b>16.50'W x 35.50'L x 2.54'H Field A</b> 0.034 af Overall - 0.008 af Embedded = 0.027 af x 35.0% Voids
#2A	195.00'	0.008 af	<b>Cultec R-150XLHD</b> x 12 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		0.017 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.50'	<b>1.020 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 192.50' Phase-In= 0.02'

**Discarded OutFlow** Max=0.03 cfs @ 12.86 hrs HW=195.78' (Free Discharge)

↑1=Exfiltration ( Controls 0.03 cfs)

**Pond 4P: ADDITION - Chamber Wizard Field A**

**Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)**

Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf

Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap

Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +24.0" End Stone x 2 = 35.50' Base Length

4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 16.50' Base Width

6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

12 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 333.8 cf Chamber Storage

1,488.8 cf Field - 333.8 cf Chambers = 1,155.0 cf Stone x 35.0% Voids = 404.3 cf Stone Storage

Chamber Storage + Stone Storage = 738.0 cf = 0.017 af

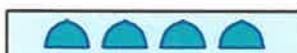
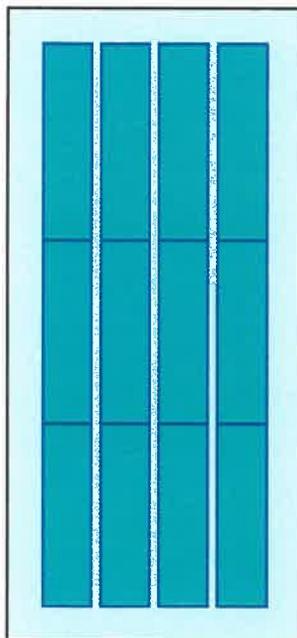
Overall Storage Efficiency = 49.6%

Overall System Size = 35.50' x 16.50' x 2.54'

12 Chambers

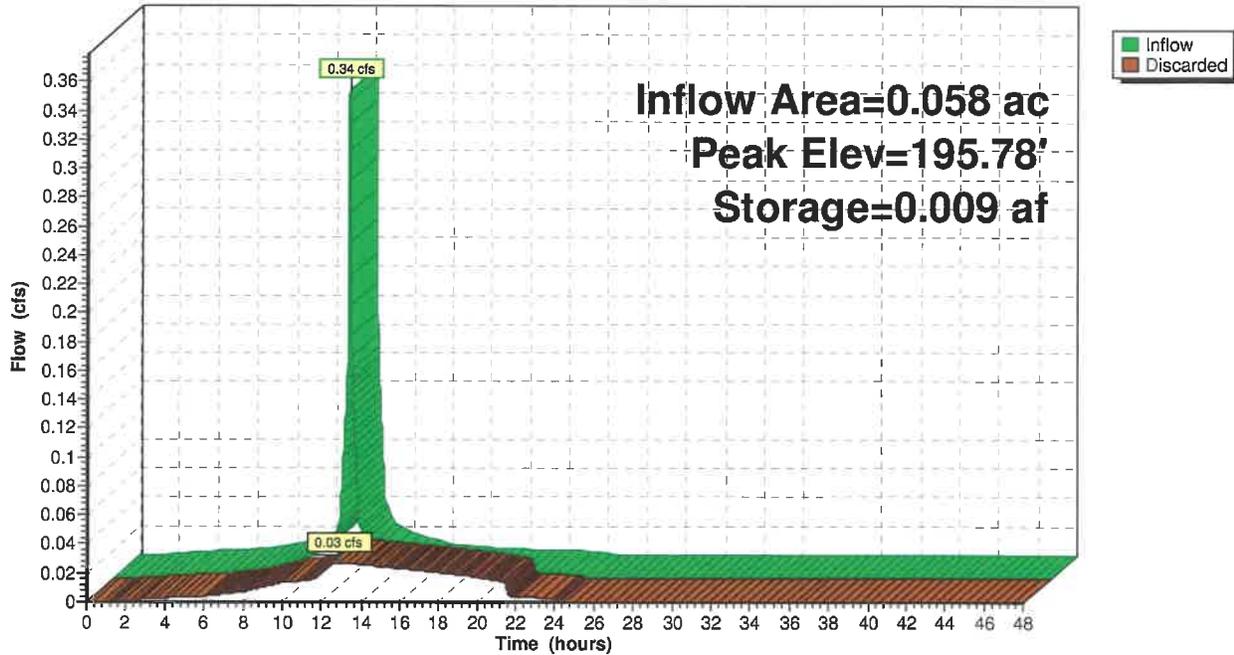
55.1 cy Field

42.8 cy Stone



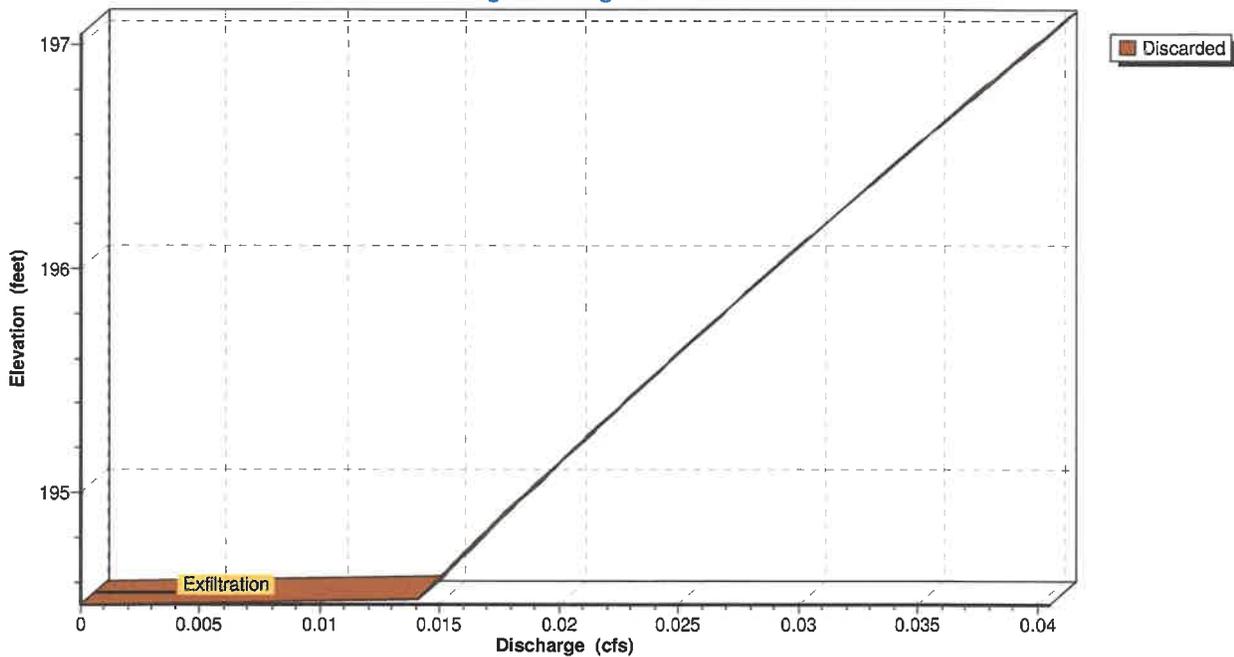
### Pond 4P: ADDITION

Hydrograph

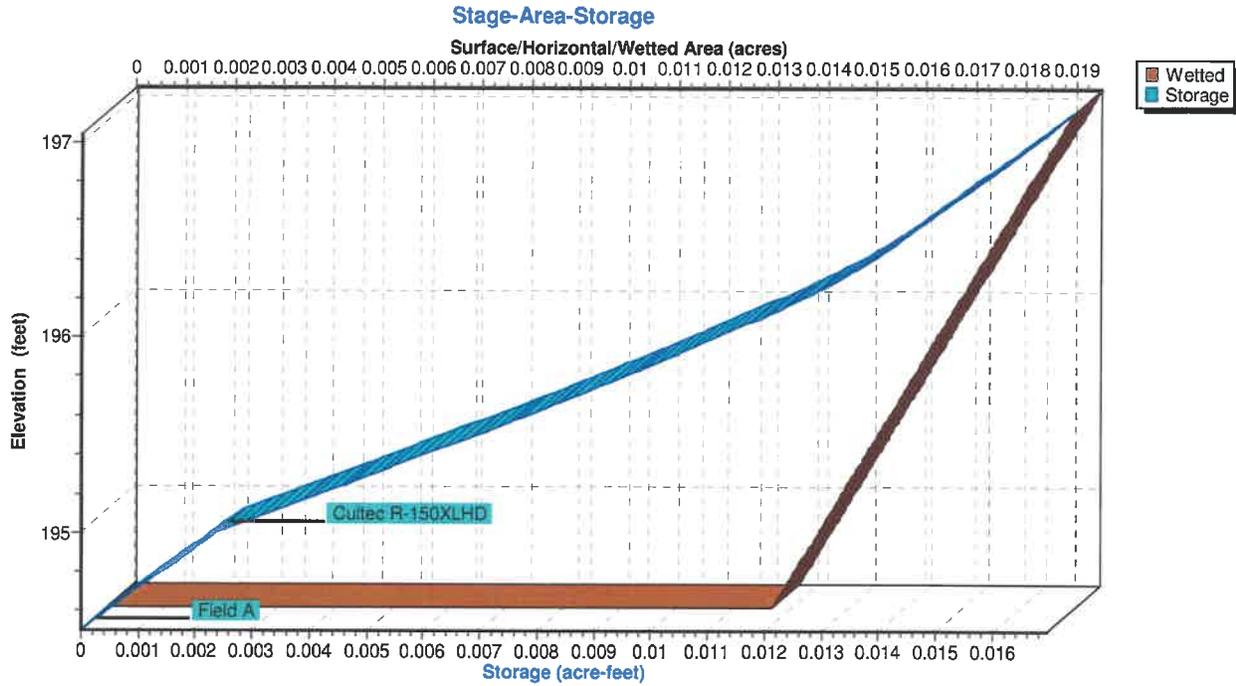


### Pond 4P: ADDITION

Stage-Discharge



### Pond 4P: ADDITION



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 50-Year Rainfall=7.26"

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**Summary for Subcatchment 9S: Basin B - ADDITION**

Runoff = 0.47 cfs @ 12.03 hrs, Volume= 0.034 af, Depth= 7.02"

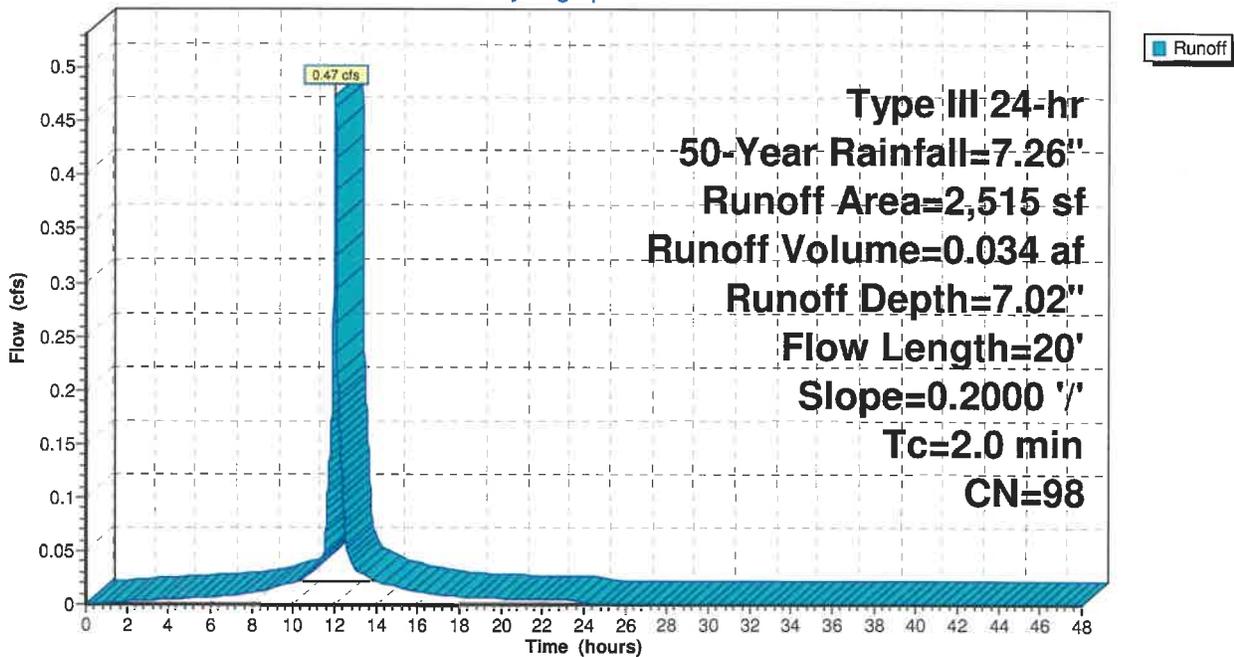
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
2,515	98	Roofs, HSG A
2,515		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.2000	2.50		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.1	20	Total, Increased to minimum Tc = 2.0 min			

**Subcatchment 9S: Basin B - ADDITION**

Hydrograph



**Summary for Subcatchment 10S: BASIN A**

Runoff = 0.48 cfs @ 12.23 hrs, Volume= 0.047 af, Depth= 2.89"

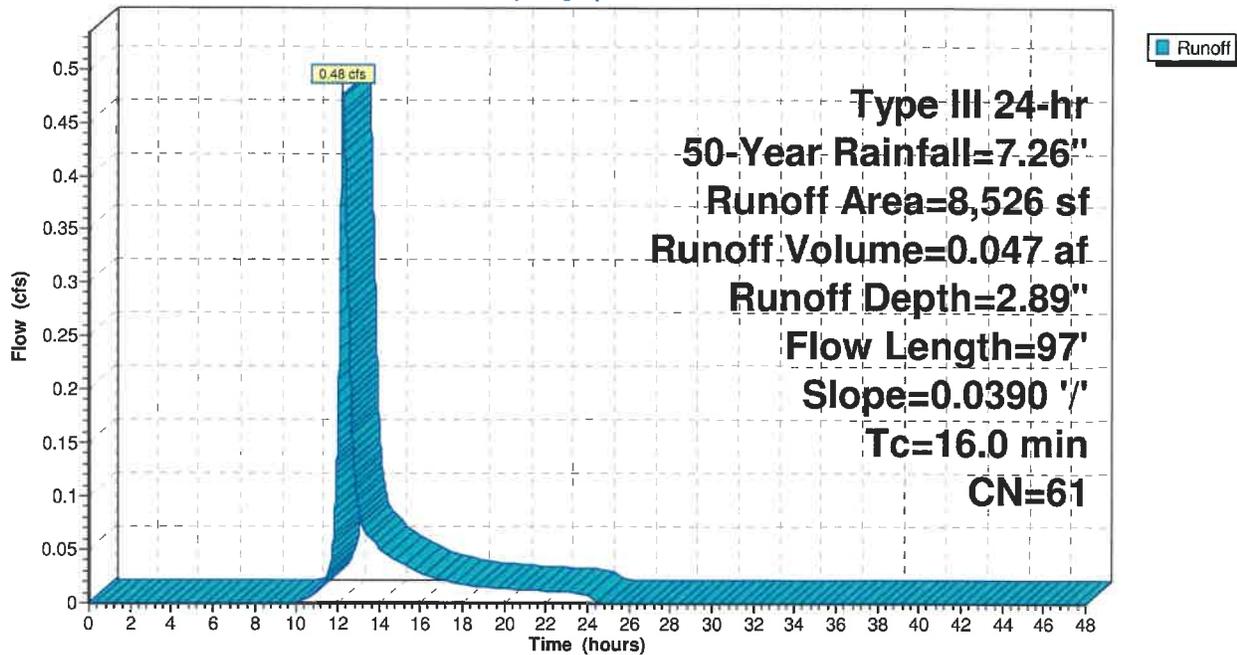
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
889	98	Roofs, HSG B
2,160	61	>75% Grass cover, Good, HSG B
5,477	55	Woods, Good, HSG B
8,526	61	Weighted Average
7,637		89.57% Pervious Area
889		10.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	97	0.0390	0.10		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 10S: BASIN A**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 50-Year Rainfall=7.26"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Subcatchment 11S: BASIN B**

Runoff = 0.54 cfs @ 12.16 hrs, Volume= 0.047 af, Depth= 3.20"

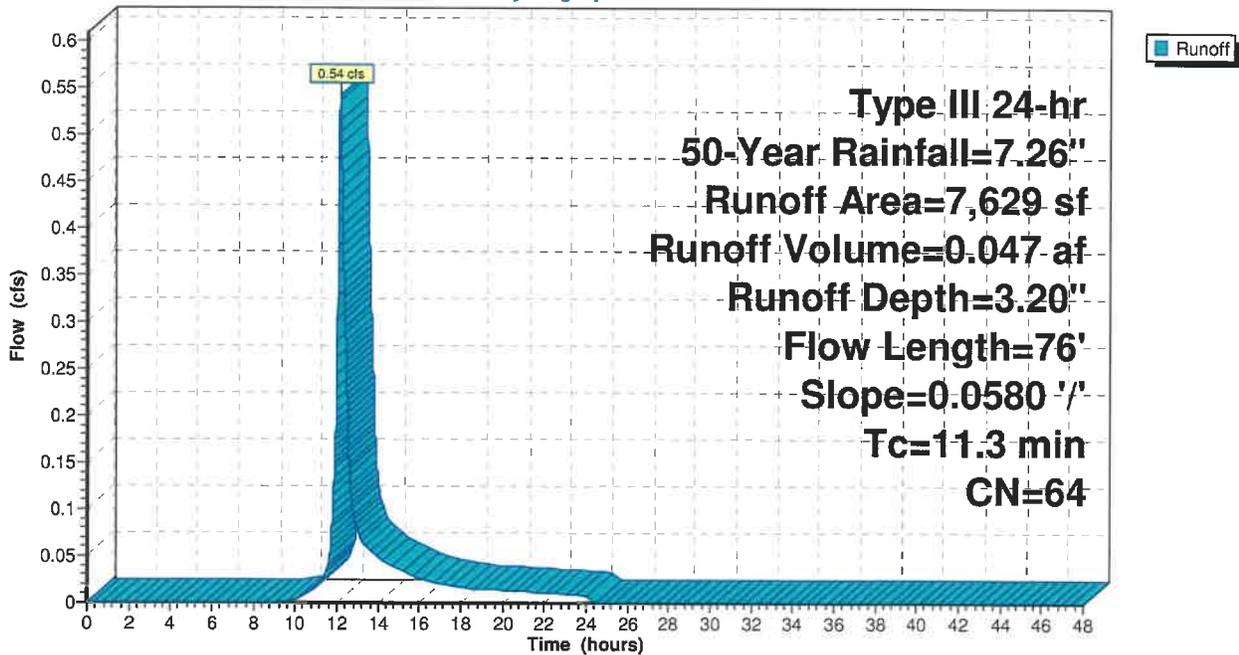
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,028	61	>75% Grass cover, Good, HSG B
3,354	55	Woods, Good, HSG B
7,629	64	Weighted Average
6,382		83.65% Pervious Area
1,247		16.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	76	0.0580	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 11S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 50-Year Rainfall=7.26"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Subcatchment 12S: BASIN C**

Runoff = 0.42 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 3.73"

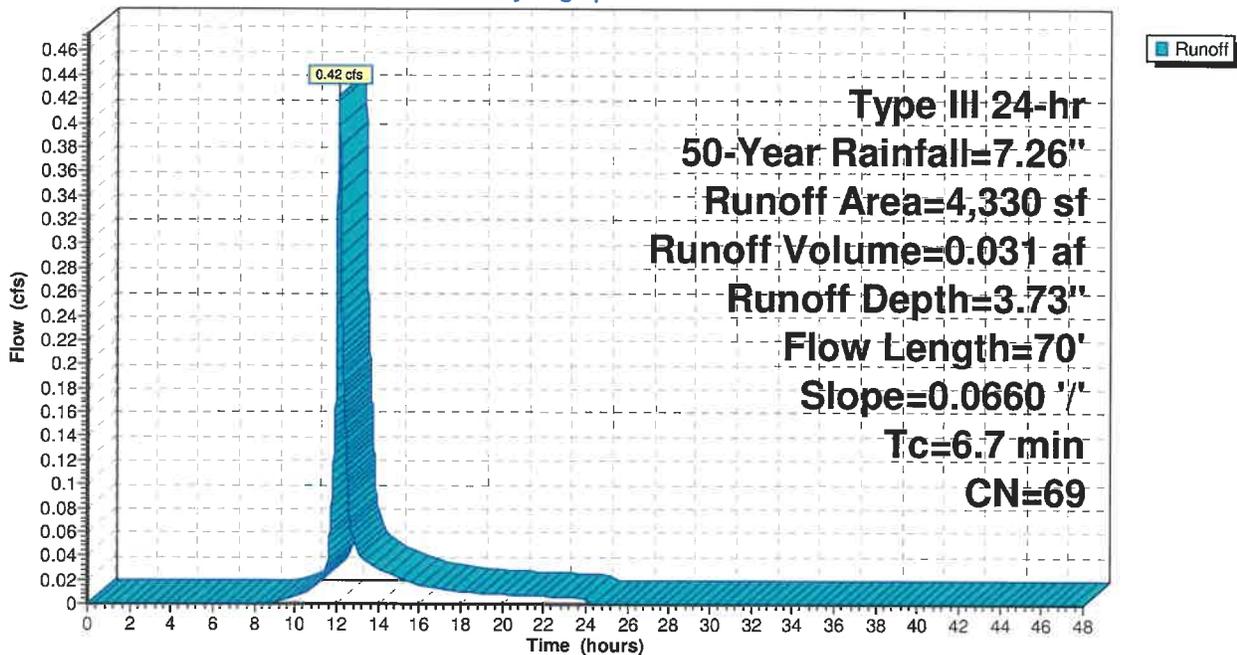
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=7.26"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 12S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 50-Year Rainfall=7.26"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Pond 4P: ADDITION**

Inflow Area = 0.058 ac, 100.00% Impervious, Inflow Depth = 7.02" for 50-Year event  
 Inflow = 0.47 cfs @ 12.03 hrs, Volume= 0.034 af  
 Outflow = 0.03 cfs @ 12.94 hrs, Volume= 0.034 af, Atten= 93%, Lag= 54.5 min  
 Discarded = 0.03 cfs @ 12.94 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 196.50' @ 12.94 hrs Surf.Area= 0.013 ac Storage= 0.014 af

Plug-Flow detention time= 179.5 min calculated for 0.034 af (100% of inflow)  
 Center-of-Mass det. time= 179.4 min ( 918.2 - 738.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	194.50'	0.009 af	<b>16.50'W x 35.50'L x 2.54'H Field A</b> 0.034 af Overall - 0.008 af Embedded = 0.027 af x 35.0% Voids
#2A	195.00'	0.008 af	<b>Cultec R-150XLHD</b> x 12 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		0.017 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.50'	<b>1.020 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 192.50' Phase-In= 0.02'

**Discarded OutFlow** Max=0.03 cfs @ 12.94 hrs HW=196.50' (Free Discharge)  
 ↑-1=Exfiltration ( Controls 0.03 cfs)

**Pond 4P: ADDITION - Chamber Wizard Field A**

**Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)**

Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf

Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap

Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +24.0" End Stone x 2 = 35.50' Base Length

4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 16.50' Base Width

6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

12 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 333.8 cf Chamber Storage

1,488.8 cf Field - 333.8 cf Chambers = 1,155.0 cf Stone x 35.0% Voids = 404.3 cf Stone Storage

Chamber Storage + Stone Storage = 738.0 cf = 0.017 af

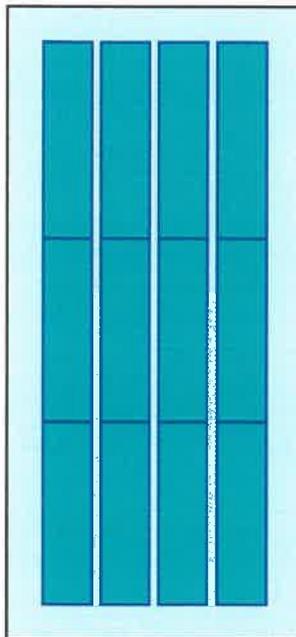
Overall Storage Efficiency = 49.6%

Overall System Size = 35.50' x 16.50' x 2.54'

12 Chambers

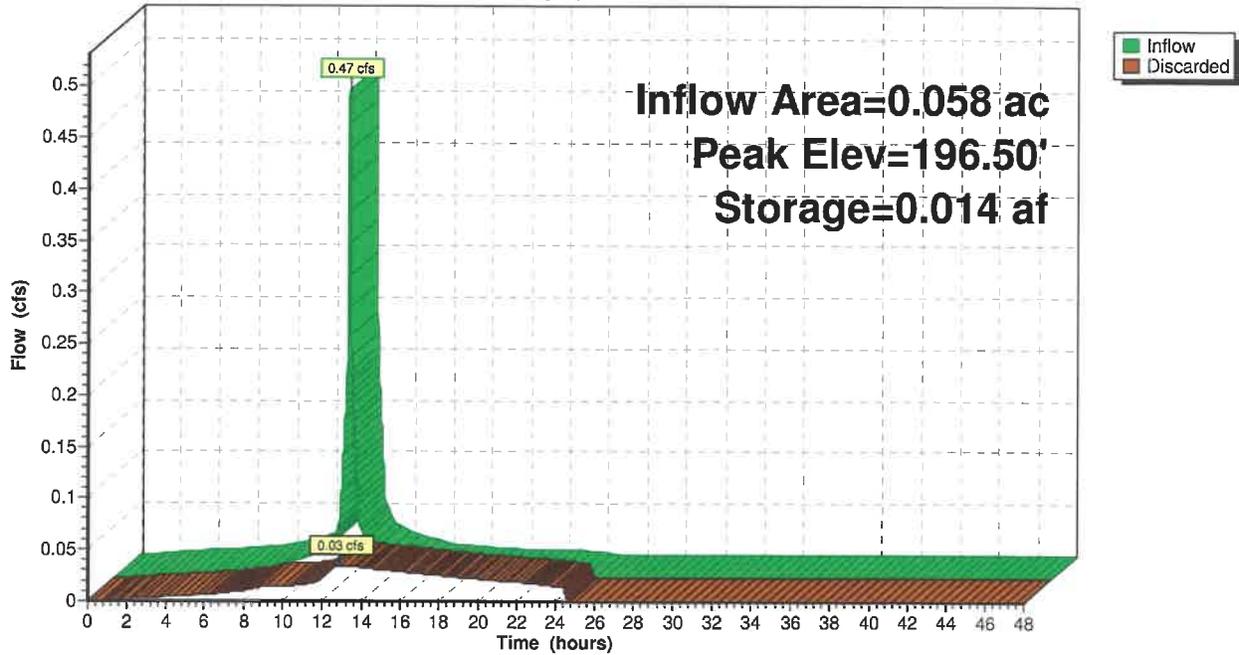
55.1 cy Field

42.8 cy Stone



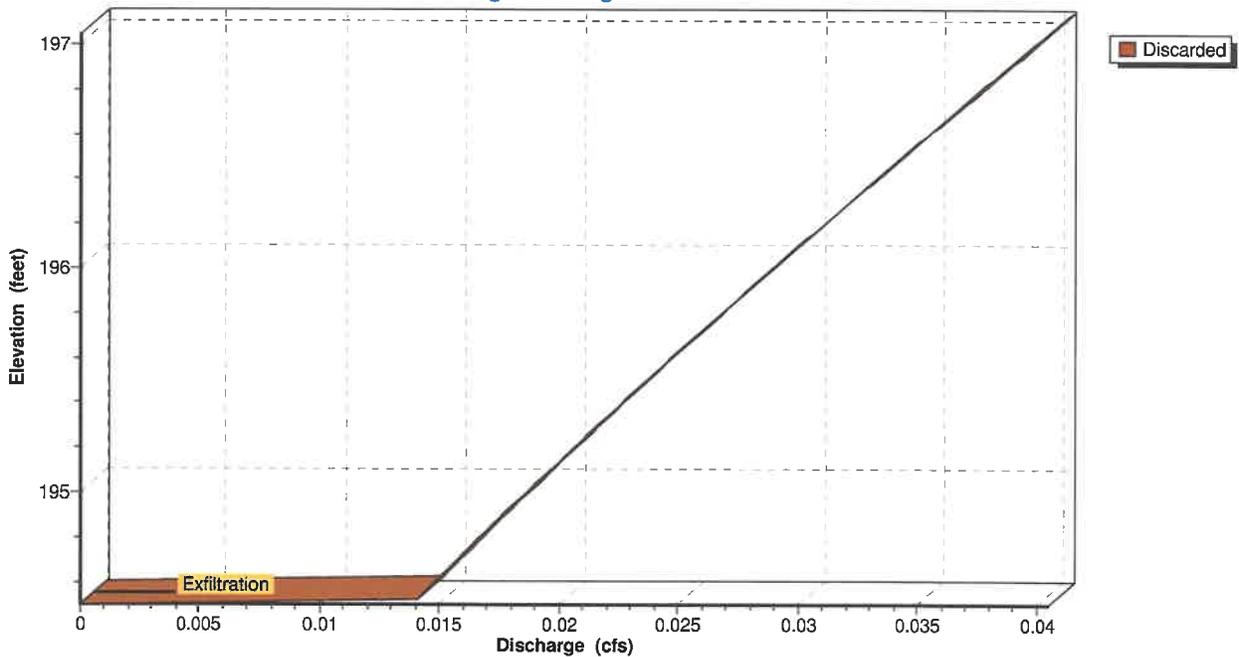
### Pond 4P: ADDITION

Hydrograph

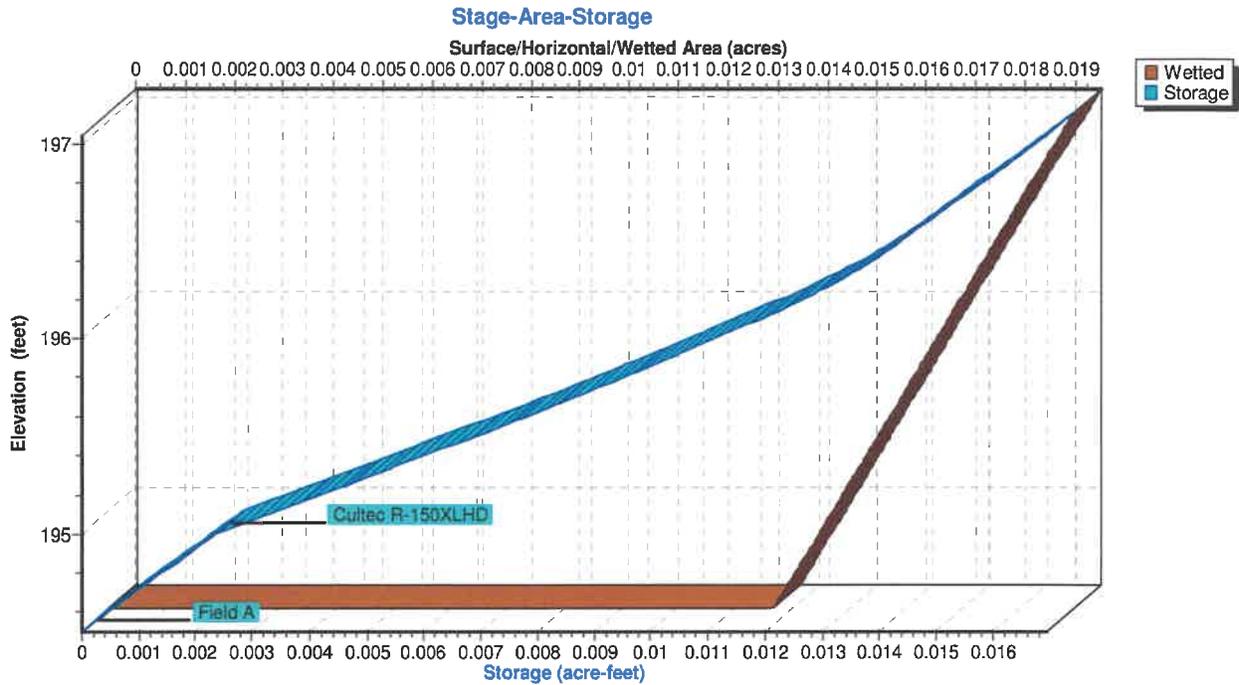


### Pond 4P: ADDITION

Stage-Discharge



### Pond 4P: ADDITION



**Summary for Subcatchment 9S: Basin B - ADDITION**

Runoff = 0.53 cfs @ 12.03 hrs, Volume= 0.038 af, Depth= 7.93"

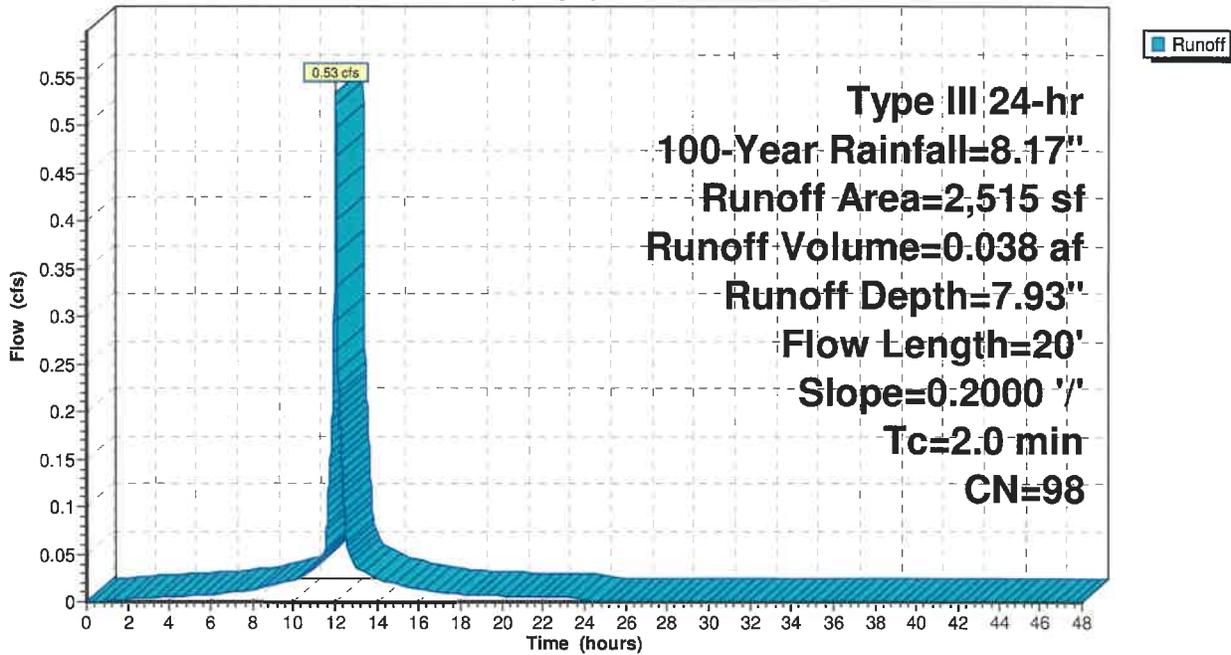
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
2,515	98	Roofs, HSG A
2,515		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.2000	2.50		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.1	20	Total, Increased to minimum Tc = 2.0 min			

**Subcatchment 9S: Basin B - ADDITION**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 100-Year Rainfall=8.17"

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**Summary for Subcatchment 10S: BASIN A**

Runoff = 0.60 cfs @ 12.22 hrs, Volume= 0.058 af, Depth= 3.57"

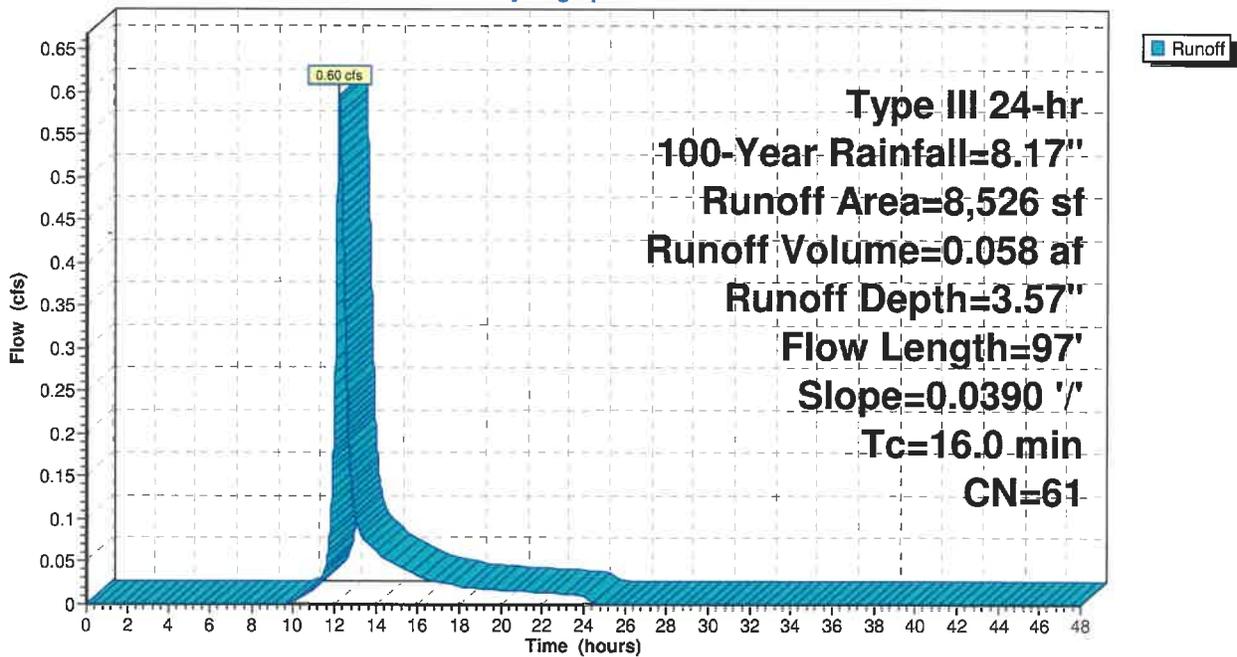
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
889	98	Roofs, HSG B
2,160	61	>75% Grass cover, Good, HSG B
5,477	55	Woods, Good, HSG B
8,526	61	Weighted Average
7,637		89.57% Pervious Area
889		10.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	97	0.0390	0.10		<b>Sheet Flow, overland</b> Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 10S: BASIN A**

Hydrograph



**Summary for Subcatchment 11S: BASIN B**

Runoff = 0.67 cfs @ 12.16 hrs, Volume= 0.057 af, Depth= 3.92"

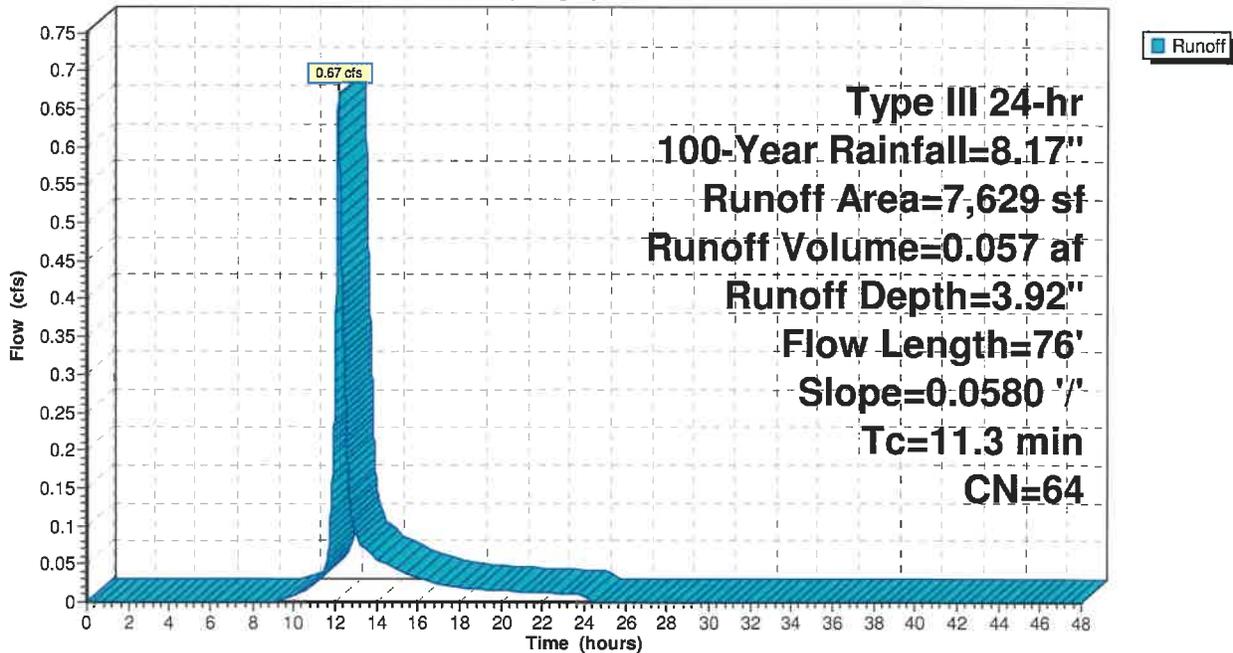
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
1,247	98	Roofs, HSG B
3,028	61	>75% Grass cover, Good, HSG B
3,354	55	Woods, Good, HSG B
7,629	64	Weighted Average
6,382		83.65% Pervious Area
1,247		16.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	76	0.0580	0.11		Sheet Flow, overland Woods: Light underbrush n= 0.400 P2= 3.20"

**Subcatchment 11S: BASIN B**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 100-Year Rainfall=8.17"

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**Summary for Subcatchment 12S: BASIN C**

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 4.49"

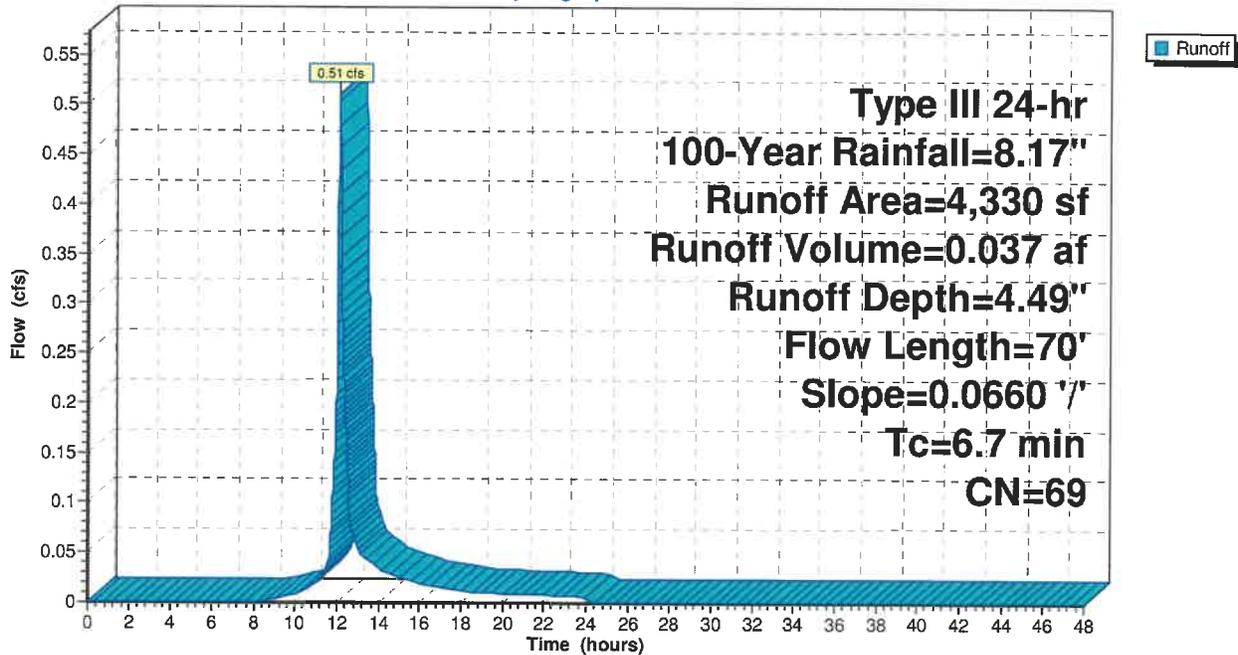
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=8.17"

Area (sf)	CN	Description
945	98	Roofs, HSG B
3,385	61	>75% Grass cover, Good, HSG B
4,330	69	Weighted Average
3,385		78.18% Pervious Area
945		21.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	70	0.0660	0.18		Sheet Flow, overland Grass: Dense n= 0.240 P2= 3.20"

**Subcatchment 12S: BASIN C**

Hydrograph



**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 100-Year Rainfall=8.17"

Prepared by Cheney Engineering Co., Inc.

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**Summary for Pond 4P: ADDITION**

Inflow Area = 0.058 ac, 100.00% Impervious, Inflow Depth = 7.93" for 100-Year event  
 Inflow = 0.53 cfs @ 12.03 hrs, Volume= 0.038 af  
 Outflow = 0.04 cfs @ 12.92 hrs, Volume= 0.038 af, Atten= 93%, Lag= 53.3 min  
 Discarded = 0.04 cfs @ 12.92 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 196.97' @ 12.92 hrs Surf.Area= 0.013 ac Storage= 0.017 af

Plug-Flow detention time= 192.8 min calculated for 0.038 af (100% of inflow)  
 Center-of-Mass det. time= 192.8 min ( 930.0 - 737.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	194.50'	0.009 af	<b>16.50'W x 35.50'L x 2.54'H Field A</b> 0.034 af Overall - 0.008 af Embedded = 0.027 af x 35.0% Voids
#2A	195.00'	0.008 af	<b>Cultec R-150XLHD</b> x 12 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		0.017 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.50'	<b>1.020 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 192.50' Phase-In= 0.02'

**Discarded OutFlow** Max=0.04 cfs @ 12.92 hrs HW=196.97' (Free Discharge)  
 ←1=Exfiltration ( Controls 0.04 cfs)

**5 Sabrina Farm Rd, Wellesley\_PROPOSED**

Type III 24-hr 100-Year Rainfall=8.17"

Prepared by Cheney Engineering Co., Inc.

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**Pond 4P: ADDITION - Chamber Wizard Field A**

**Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)**

Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf

Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap

Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +24.0" End Stone x 2 = 35.50' Base Length

4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 24.0" Side Stone x 2 = 16.50' Base Width

6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

12 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 333.8 cf Chamber Storage

1,488.8 cf Field - 333.8 cf Chambers = 1,155.0 cf Stone x 35.0% Voids = 404.3 cf Stone Storage

Chamber Storage + Stone Storage = 738.0 cf = 0.017 af

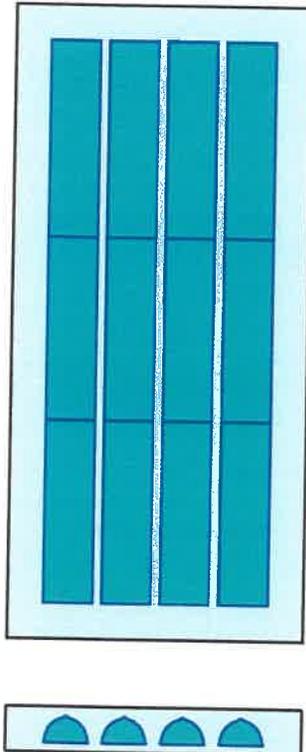
Overall Storage Efficiency = 49.6%

Overall System Size = 35.50' x 16.50' x 2.54'

12 Chambers

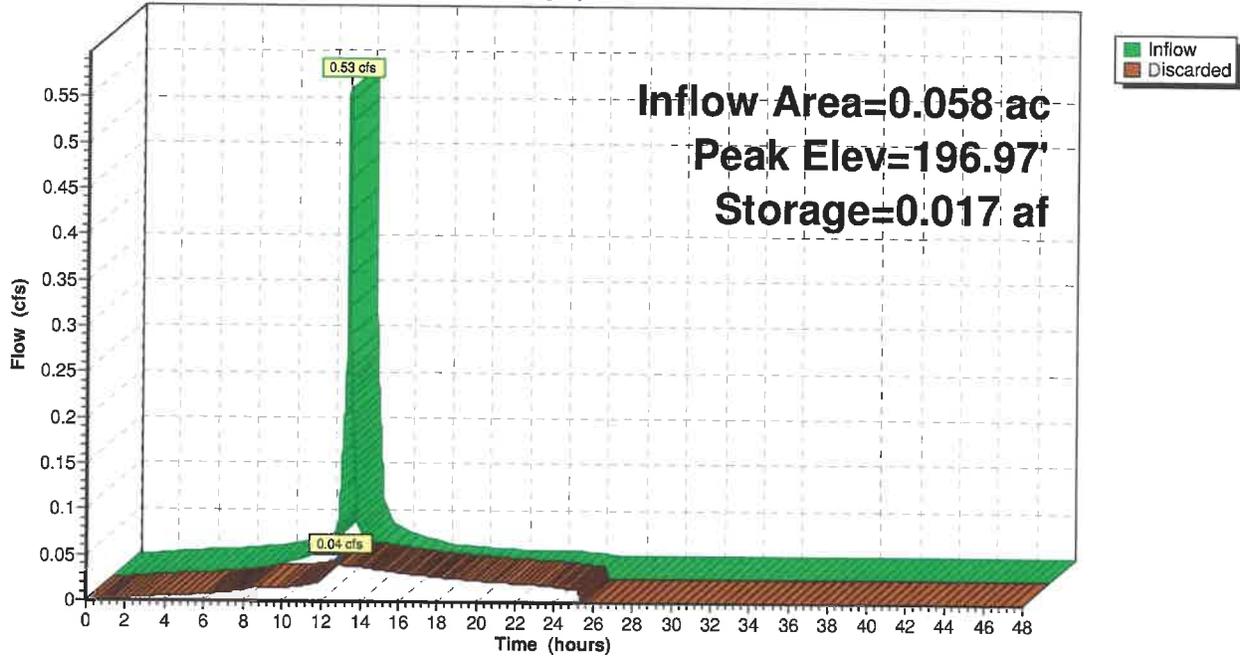
55.1 cy Field

42.8 cy Stone



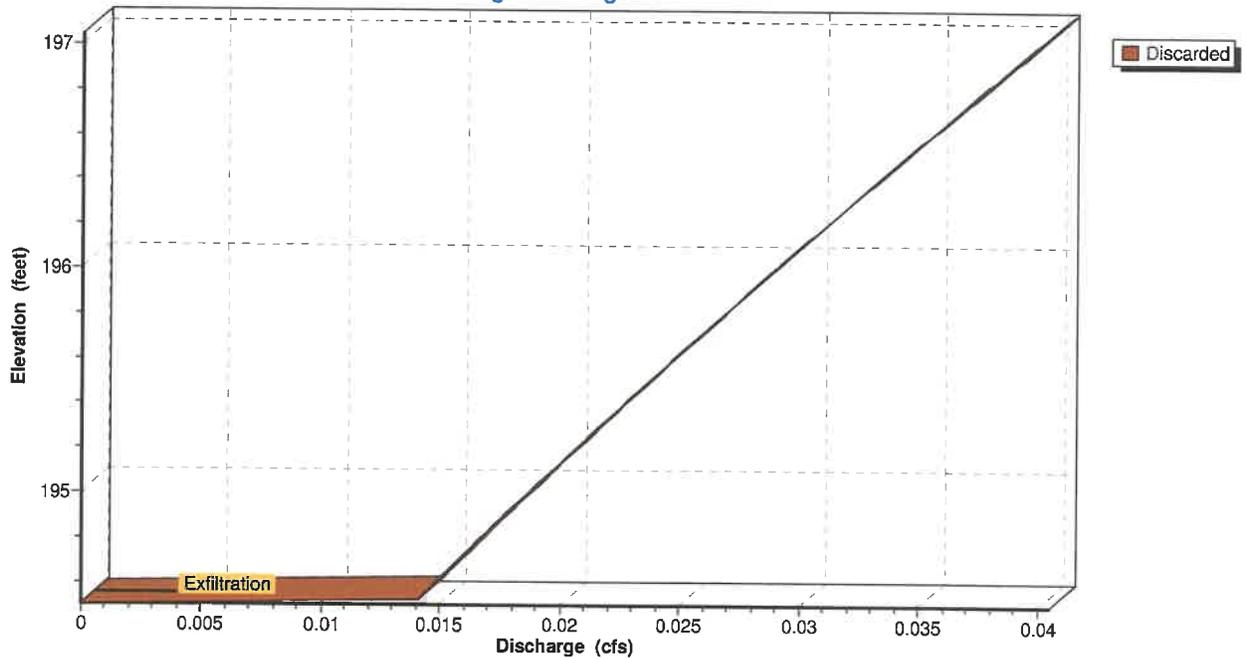
### Pond 4P: ADDITION

Hydrograph

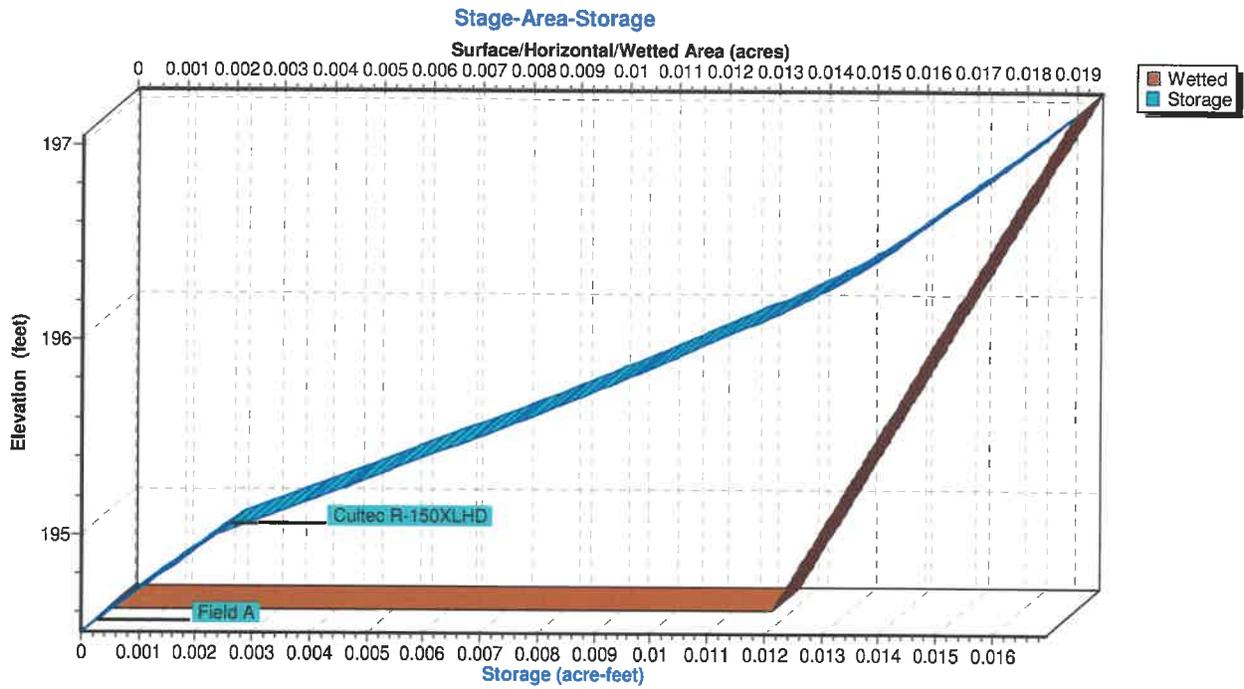


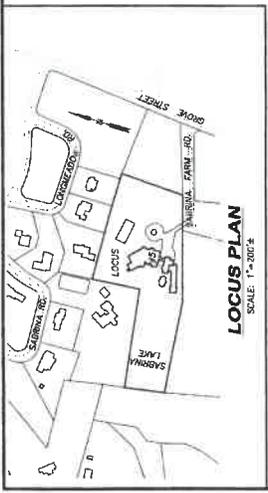
### Pond 4P: ADDITION

Stage-Discharge



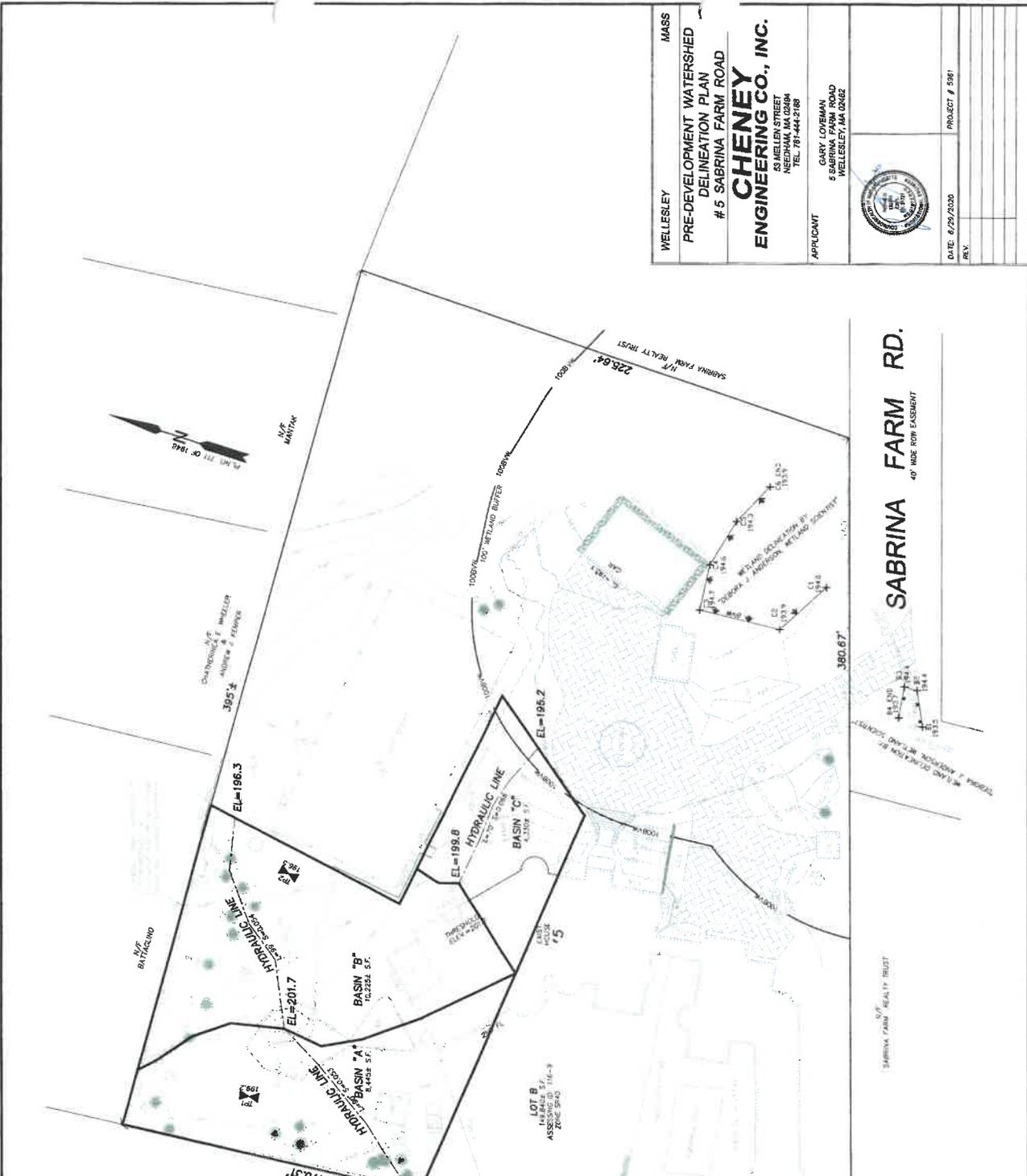
### Pond 4P: ADDITION





**LOCUS PLAN**  
SCALE: 1"=200'

- LEGEND**
- BT. BITUMINOUS UNGRAVELLED WAY
  - FF. FINISHED FLOOR
  - GP. GRANITE
  - OP. OPEN
  - PP. POWER POLE
  - PA. POWER POLE ALUMINUM
  - GA. GARAGE
  - TO. TOP OF CONCRETE
  - TC. TOP OF CURB
  - EXISTING CONTOUR
  - - - PROPOSED CONTOUR
  - TREE TO BE CUT
  - 24" TREE



**SABRINA FARM RD.**  
40' WIDE ROP EXASMENT



PROPERTY OWNER: WELSH TRUST  
BK. 19819 - PG. 127

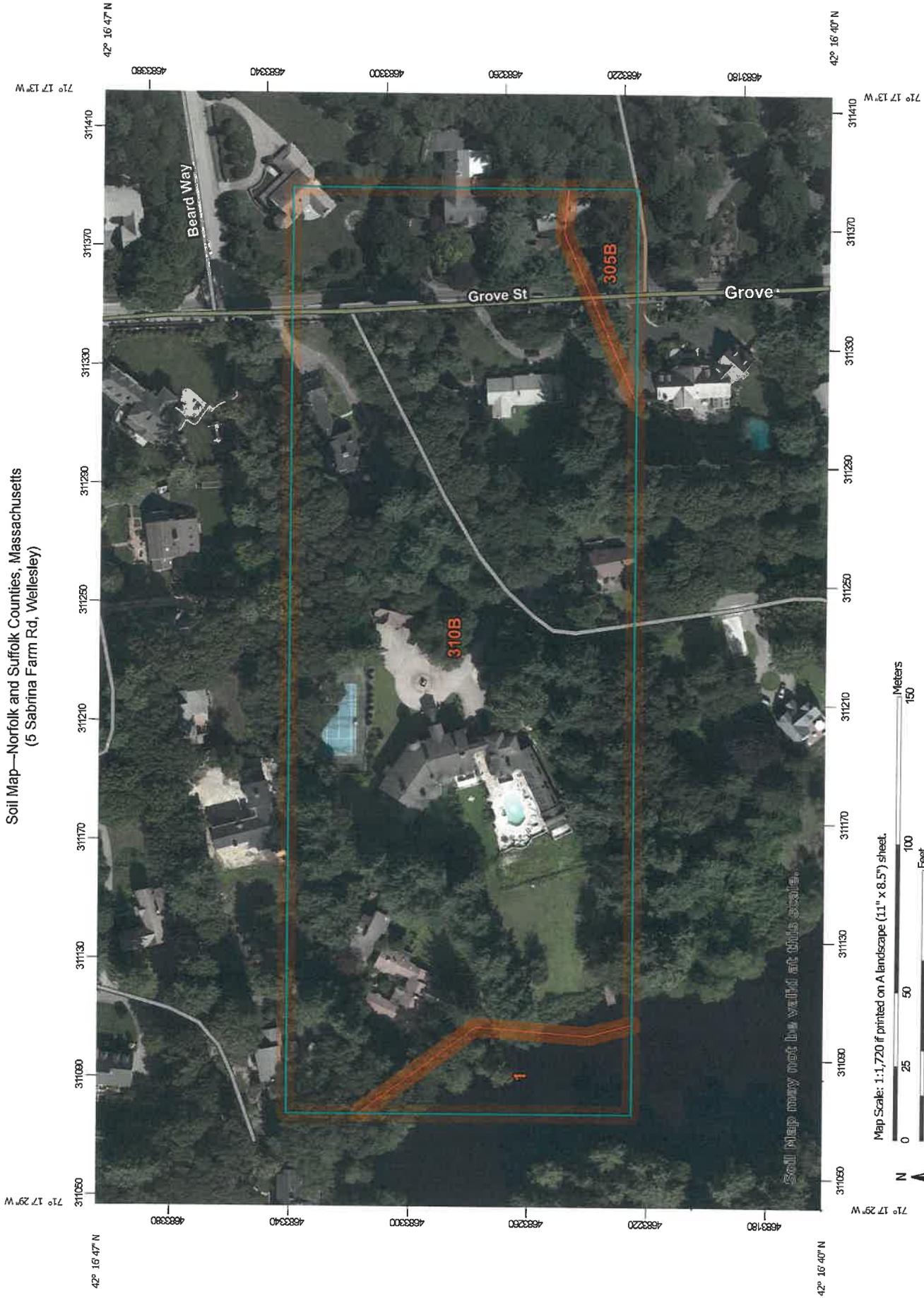
WELLESLEY MASS  
PRE-DEVELOPMENT WATERSHED  
DELINEATION PLAN  
# 5 SABRINA FARM ROAD  
**CHENEY ENGINEERING CO., INC.**  
23 WELLEN STREET  
NEEDHAM, MA 02464  
TEL. 781-444-2189

APPLICANT: GARY LOEBMAN  
65 WELLESLEY ROAD  
WELLESLEY, MA 02452

DATE: 6/29/2020 PROJECT # 2081  
REV. \_\_\_\_\_



Soil Map—Norfolk and Suffolk Counties, Massachusetts  
 (5 Sabrina Farm Rd, Wellesley)



Soil Map may not be valid at this scale.

Map Scale: 1:1,720 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

## MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Soils**
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Water Features**
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts  
Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 28, 2019—Aug 15, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.5	5.7%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	0.3	2.9%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	8.2	91.4%
<b>Totals for Area of Interest</b>		<b>9.0</b>	<b>100.0%</b>

## Norfolk and Suffolk Counties, Massachusetts

### 310B—Woodbridge fine sandy loam, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2t2ql  
*Elevation:* 0 to 1,470 feet  
*Mean annual precipitation:* 36 to 71 inches  
*Mean annual air temperature:* 39 to 55 degrees F  
*Frost-free period:* 140 to 240 days  
*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Woodbridge, fine sandy loam, and similar soils:* 82 percent  
*Minor components:* 18 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Woodbridge, Fine Sandy Loam

##### Setting

*Landform:* Hills, drumlins, ground moraines  
*Landform position (two-dimensional):* Backslope, footslope, summit  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

##### Typical profile

*Ap - 0 to 7 inches:* fine sandy loam  
*Bw1 - 7 to 18 inches:* fine sandy loam  
*Bw2 - 18 to 30 inches:* fine sandy loam  
*Cd - 30 to 65 inches:* gravelly fine sandy loam

##### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* 20 to 39 inches to densic material  
*Natural drainage class:* Moderately well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)  
*Depth to water table:* About 18 to 30 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 3.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* C/D

*Ecological site:* Moist Dense Till Uplands (F144AY037MA)  
*Hydric soil rating:* No

**Minor Components**

**Paxton**

*Percent of map unit:* 10 percent  
*Landform:* Hills, ground moraines, drumlins  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Side slope, crest, nose slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

**Ridgebury**

*Percent of map unit:* 8 percent  
*Landform:* Hills, ground moraines, depressions, drainageways  
*Landform position (two-dimensional):* Toeslope, backslope, footslope  
*Landform position (three-dimensional):* Base slope, head slope, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Data Source Information**

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts  
Survey Area Data: Version 16, Jun 11, 2020



Commonwealth of Massachusetts  
City/Town of Wellesley

*DRAINAGE*  
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

**A. Facility Information**

Gary Loveman  
Owner Name  
5 Sabrina Farm Road  
Street Address  
Wellesley  
City  
MA  
State  
Map/lot #  
Zip Code

**B. Site Information**

- (Check one)  New Construction  Upgrade  Repair  
If yes: Web Soil Survey Source \_\_\_\_\_ Soil Map Unit \_\_\_\_\_  
Somewhat excessively drained  
Soil Limitations  
Outwash terraces  
Soil Name  
loamy glaciofluvial over sandy glaciofluvial derived from granite
- Soil Survey Available?  Yes  No  
Woodbridge  
Soil Name  
loamy glaciofluvial over sandy glaciofluvial derived from granite
- Surficial Geological Report Available?  Yes  No  
If yes: Year Published/Source \_\_\_\_\_ Publication Scale \_\_\_\_\_ Map Unit \_\_\_\_\_  
Landform
- Flood Rate Insurance Map  
Above the 500-year flood boundary?  Yes  No  
If Yes, continue to #5. Within the 100-year flood boundary?  Yes  No
- Within a velocity zone?  Yes  No
- Within a Mapped Wetland Area?  Yes  No  
MassGIS Wetland Data Layer: \_\_\_\_\_ Wetland Type \_\_\_\_\_  
Range:  Above Normal  Normal  Below Normal
- Current Water Resource Conditions (USGS): 9/17  
Month/Year
- Other references reviewed: FIRM 25021C0018E



Commonwealth of Massachusetts  
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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

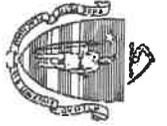
*DRAINAGE*

**C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)**

Deep Observation Hole Number: TP1 Date: 3/3/20 Time: 12:00 Weather: sunny

1. Location  
Ground Elevation at Surface of Hole: 199.2 feet Latitude/Longitude: /  
Description of Location: back yard north westerly corner of property

2. Land Use SFH (e.g., woodland, agricultural field, vacant lot, etc.) Yes Surface Stones (e.g., cobbles, stones, boulders, etc.) 0-3  
wooded Vegetation drumlin Landform TS Position on Landscape (SU, SH, BS, FS, TS)  
3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Wetlands >100 feet  
Property Line >25 feet Drinking Water Well >100 feet Other  
4. Parent Material: gravely fine sandy loam Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock  
5. Groundwater Observed:  Yes  No If yes: Depth Weeping from Pit Depth Standing Water In Hole  
Estimated Depth to High Groundwater: >72 inches elevation



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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

*DRAINAGE*

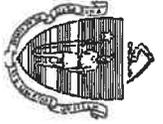
**C. On-Site Review (continued)**

Deep Observation Hole Number: TP1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	Oa	10 YR 2/2									loose
8-12	Ap	10 YR 3/4				SL					loose
12-24	Bw	10YR 8/8				LS					granular
24-72	C1	10 YR 8/1				SL	Many	few			granular
72	Cr										boulder

Additional Notes:

TP1 -Excavated around a rock nub just on the south side of shown test pit location



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*DRAINAGE*

**C. On-Site Review (continued)**

Deep Observation Hole Number: TP2 Date: 3/3/20 Time: 12:00 Weather: Sunny

1. Location

Ground Elevation at Surface of Hole: 196.5 feet Latitude/Longitude: NA / 0-3

2. Land Use SFH (e.g., woodland, agricultural field, vacant lot, etc.) Drumlin Surface Stones (e.g., cobbles, stones, boulders, etc.) TS Slope (%) 0-3

3. Distances from: Wood Landform Open Water Body >200 feet Drainage Way >50 feet Wetlands >100 feet  
Property Line >25 feet Drinking Water Well 100 feet Other feet

4. Parent Material: gravelly fine sandy loam Unsuitable Materials Present:  Yes  No

If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: 40" Depth Weeping from Pit 40" Depth Standing Water in Hole 193.2 elevation

Estimated Depth to High Groundwater: 40" inches



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*DRAINAGE*

**C. On-Site Review (continued)**

Deep Observation Hole Number: TP 2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	Oa	10 YR 2/2							friable		roots
6-8	Ap	10 YR 3/4				SL			friable		
8-24	Bw	10 YR 8/8				LS			granular		
24-84	C1	10 YR 8/1	48	2.5 Y 5/4		LS			Granular	moist	see notes

Additional Notes:

Neighbors sump pump discharging in vicinity towards test pit area and influencing test results



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*DRAINAGE*

**D. Determination of High Groundwater Elevation**

1. Method Used:
- Depth observed standing water in observation hole  
 Obs. Hole # TP1 \_\_\_\_\_ inches \_\_\_\_\_  
 Obs. Hole # TP2 \_\_\_\_\_ inches \_\_\_\_\_
  - Depth weeping from side of observation hole  
 na inches 40 inches
  - Depth to soil redoximorphic features (mottles)  
 na inches 48 inches
  - Depth to adjusted seasonal high groundwater ( $S_h$ )  
 (USGS methodology) \_\_\_\_\_ inches \_\_\_\_\_

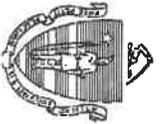
Index Well Number \_\_\_\_\_ Reading Date \_\_\_\_\_

$$S_h = S_c - [S_r \times (OW_c - OW_{max}) / OW_r]$$

Obs. Hole # _____	$S_c$ _____	$S_r$ _____	$OW_c$ _____	$OW_{max}$ _____	$OW_r$ _____	$S_h$ _____
Obs. Hole # _____	$S_c$ _____	$S_r$ _____	$OW_c$ _____	$OW_{max}$ _____	$OW_r$ _____	$S_h$ _____

**E. Depth of Pervious Material**

1. Depth of Naturally Occurring Pervious Material
- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?  
 Yes  No
- b. If yes, at what depth was it observed?  
 Upper boundary: 24 inches Lower boundary: 72 inches
- c. If no, at what depth was impervious material observed?  
 Upper boundary: \_\_\_\_\_ inches Lower boundary: \_\_\_\_\_ inches



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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**  
*DRAINAGE*

**F. Board of Health Witness**

Name of Board of Health Witness

Board of Health

**G. Soil Evaluator Certification**

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

*Thomas A. Ryder*  
 Signature of Soil Evaluator

3/3/20  
 Date

Thomas Ryder /212-1  
 Typed or Printed Name of Soil Evaluator / License #

6/2019  
 Expiration Date of License

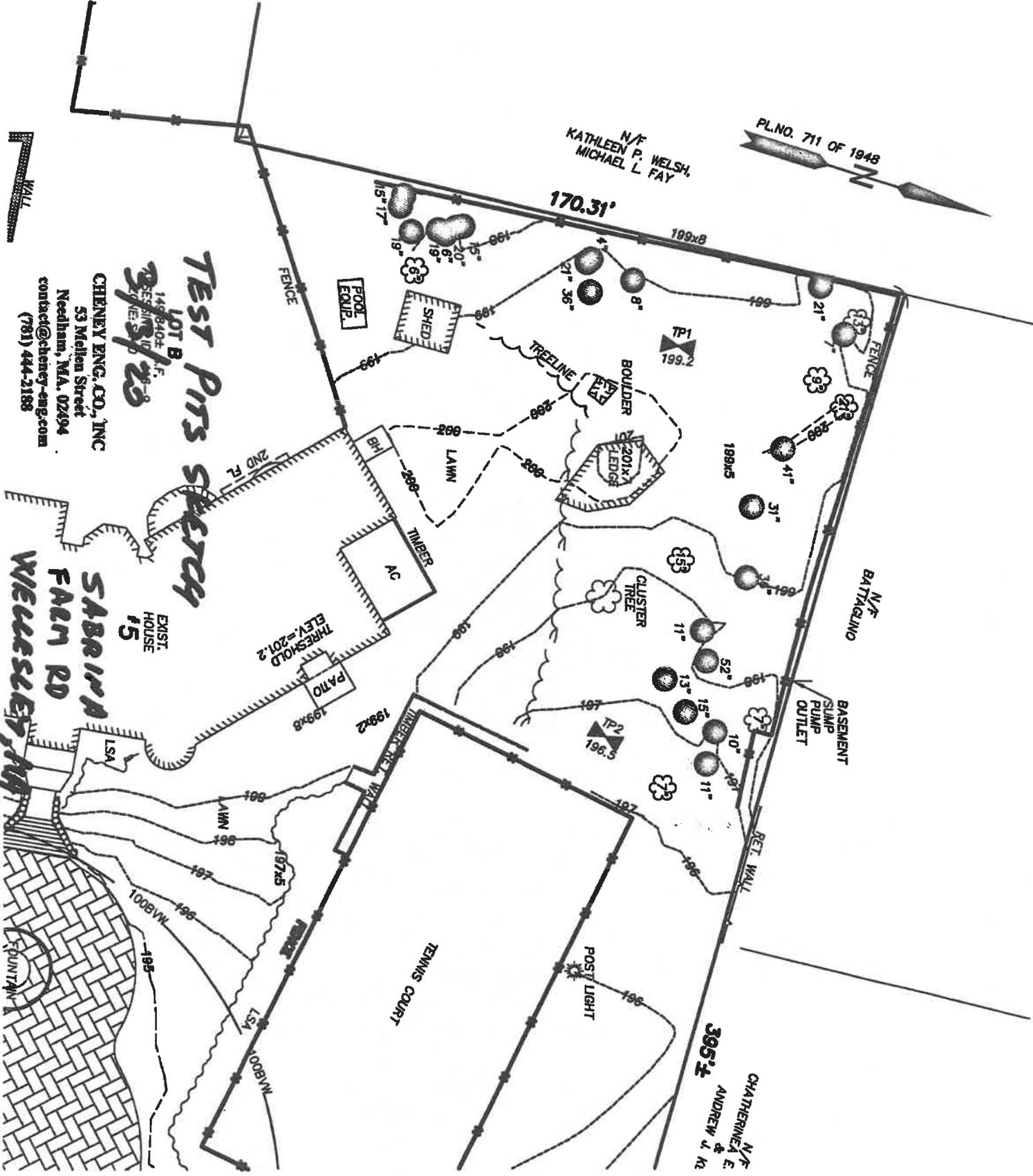
**Note:** In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

PL. NO. 711 OF 1948

N/F  
KATHLEEN P. WELSH,  
MICHAEL L. FAY

N/F  
CHATHERINE E.  
ANDREW J. M.

N/F  
BATTAGLINO



**TEST PITS SURVEY**

LOT B  
1458402 N.F.  
3/28/23

CHENEY ENG. CO., INC  
53 Melten Street  
Needham, MA. 02494  
contact@chene-engine.com  
(781) 444-2188

SABRINA  
FARM RD  
WELLESLEY, MA

EXIST.  
HOUSE  
#15

THRESHOLD  
ELEV. = 201.2

395.4

Gary Loveman  
5 Sabrina Farm Rd  
Wellesley, MA 02482

2/28/2020

Wellesley Planning Department  
Wellesley Town hall  
525 Washington Street  
Wellesley, MA 02482  
Attention: Don McCauley, Planning Director

**Re: 5 Sabrina Farm Road, Large House Review - Waiver Request**

Dear Mr. McCauley,

In anticipation of filing for Large House Review for my property at 5 Sabrina Farm Road, I am requesting this waiver to limit the area of the lot to be analyzed for landscaping and drainage purposes.

The lot size is 149,840+/- square feet and the proposed improvement will only have an impact on part of the lot. Attached you will find Proposed Limit of Work Plan identifying 23,000+/- square feet of the lot that we are proposing to be analyzed under the large house review process for landscaping and drainage purposes.

Project consist on adding to the existing house with associated re-grading, drainage and landscaping.

Thank you for considering our waiver request.

Sincerely,

  
Gary Loveman

